AUGUST 1966

BASIC COURSE IN

EMERGENCY MASS FEEDING

HANDBOOK

H-15

ARC-2219A

Developed Jointly by

DEPARTMENT OF DEFENSE • OFFICE OF CIVIL DEFENSE

THE AMERICAN NATIONAL RED CROSS

and

WELFARE ADMINISTRATION

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

BASIC COURSE IN EMERGENCY MASS FEEDING

HANDBOOK

(H-15—August 1966)

(Supersedes PM-1, dated Jan. 1957)

Developed Jointly By

DEPARTMENT OF DEFENSE, OFFICE OF CIVIL DEFENSE,

THE AMERICAN NATIONAL RED CROSS

and

WELFARE ADMINISTRATION

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Introduction

THIS HANDBOOK has been developed by the American National Red Cross; the Office of Civil Defense, Department of the Army; and the Welfare Administration, Department of Health, Education, and Welfare; as a textbook and reference in the training course, "Basic Course in Emergency Mass Feeding." It is also designed as a ready reference for food workers who might become engaged in actual emergency feeding operations. An Instructor's Guide is available for teaching purposes to any components of the organizations mentioned above. These two publications serve as a guide for uniform training in emergency mass feeding throughout the Nation, basic objectives of which are to sustain life, maintain the efficiency of the people and help restore morale.

In case of a major emergency, these trained workers may be called upon as needed to work either through the Red Cross or the Civil Defense Emergency Welfare Services.[1]

Within the limitations imposed by the problem of radioactive fallout, the principles and techniques of disaster

[1] The Department of Health, Education, and Welfare under Executive Order 11001, dated February 16, 1962, has responsibility for planning and developing the Civil Defense Emergency Welfare Services (including emergency feeding) for use during a national emergency, and for guiding and assisting the States and local communities in their emergency welfare programs. State and local public welfare organizations are authorized by State legislation or directive to develop emergency programs and operating capability as part of civil defense readiness.

Guidance relating to the organization and administration of Emergency Feeding and the Emergency Welfare Services is set forth in "Emergency Welfare Services—Guidelines and Structure" and "Emergency Feeding," Part E, Chapters 13 and 13.4 respectively, Appendix I of the Federal Civil Defense Guide. Copies of these manuals may be obtained through State and local public welfare agencies and through State and local government civil defense offices.

The American National Red Cross under Public Law 4, approved January 5, 1905, (33 Stat., 599), as amended, is charged with responsibility, nationally and through its chapters, for the relief of families and individuals suffering from the effects of disasters in which numbers of persons are plunged into helplessness and suffering and as a result may need basic necessities.

Guidance relating to the organization and administration of the American Red Cross disaster relief program may be obtained through local Red Cross chapters, Red Cross Area Offices in Alexandria, Virginia; Atlanta, Georgia; St. Louis, Missouri; and San Francisco, California, or Red Cross National Headquarters in Washington, D. C.

feeding mentioned in the Handbook are applicable in community fallout shelter feeding. In the postshelter period of an enemy-caused disaster, the feeding procedures and methods would be similar to the emergency feeding operations in a natural disaster.

The material is arranged in two parts. The first part consists of four sections related to the sequence of subjects as they are presented in the Instructor's Guide, "Basic Course in Emergency Mass Feeding." The second part is composed of appendices which furnish tables, recipes and other useful guides for quantity food service operations.

TABLE OF CONTENTS

SECTION 2—FEEDING SERVICES IN DISASTER

SECTION 3—SAFE FOOD AND WATER

SECTION 4—FOOD SERVICE MANAGEMENT

SCHEDULE TO BE COMPLETED WHEN ENROLLED IN "BASIC COURSE IN EMERGENCY MASS FEEDING"

(FILL IN DATES AND TIME DURING THE FIRST CLASSROOM SESSION)

LESSON NO.	LESSON TITLE	DATE	TIME
1	**Mass Feeding in Community Fallout Shelters**		
2	**Feeding Services in Disaster**		
3	**Safe Food and Water**		
4	**Food Service Management**		
5	**Planning the Exercise in Mobile Feeding**		
6	**Mobile Feeding Exercise** **Place**_____		

STUDENTS' PRE-COURSE QUESTIONNAIRE

(These questions will provide a preview of the course. You are not expected to know all the right answers, but do the best you can. Circle the letter opposite your choice. When finished, the instructor will read the answers so you will have the correct statement for reference during the course.)

1. The objective of the current National Civil Defense Program is protection of the population from:
   a. *blast*
   b. *heat*
   c. *radioactive fallout*
   d. *all of the above*
2. The major element of present day civil defense planning concerns:
   a. *fallout shelters*
   b. *warning systems*
   c. *evacuation techniques*
   d. *RADEF technique*
3. The Federal Government will provide food and supplies to local governments for licensed shelters with a protection factor of 40 or more and with a capacity of:
   a. *10 or more persons*
   b. *50 or more persons*
   c. *100 or more persons*
   d. *500 or more persons*
4. Water that is properly stored in a shelter:
   a. *must be changed every 6 months*
   b. *must be changed once a year*
   c. *must be changed once every two years*
   d. *will last for an indefinite period*

5. The basic recipe for emergency coffee that will provide approximately 50 cups (6 oz. size) is:
   a. *2½ gallons of boiling water and 1 pound of regular grind coffee*
   b. *4 gallons of boiling water and 2 pounds of regular grind coffee*
   c. *15 quarts of cold water with 1 pound of regular grind coffee*
   d. *10 quarts of boiling water and 8-ounce jar of instant coffee*
6. The term "mobile canteen" for emergency purposes is best described by which of the following:
   a. *providing food for people in groups*
   b. *feeding people food prepared in a mobile kitchen*
   c. *preparation of food at one place, to be moved by readily available vehicles and served at another location*
   d. *improvised food service for people in a disaster*
7. Reconstituted canned and powdered milk:
   a. *requires the same care as fresh fluid milk*
   b. *can be kept indefinitely*
   c. *needs no refrigeration*
   d. *should be pasteurized*
8. When there are many infants in a disaster mass care shelter, special provisions should be made for their supervised feeding. For which of the following reasons is this necessary:
   a. *infant feeding is a highly specialized procedure*
   b. *individualized feeding is neither practical nor safe*
   c. *increased potential for illness and spread of communicable disease is especially hazardous for infants*
   d. *all of the above reasons*
9. In order to provide a greatly increased amount of protein recommended by a physician for the daily diet of a sick or injured disaster victim, a disaster feeding team could safely meet this need in an emergency by:
   a. *preparing a mixture of equal parts of nonfat dry milk and fresh whole milk*
   b. *use of butter and cream to increase calories*
   c. *serving much larger portions of fruits and vegetables*
   d. *giving bouillon broth every other day*

10. If milk supplies were extremely limited and had to be rationed in an emergency, in what order of priority would you allocate the supplies among the following:
    ( ) *a sick girl 12 years old*
    ( ) *a well adolescent boy*
    ( ) *a nursing mother*
    ( ) *a six months old baby*
    ( ) *a pregnant woman*
    ( ) *a one year old baby girl*

11. The temperatures at which food should be kept to prevent excessive bacterial growth are:
    a. *below 32°F and above 140°F*
    b. *below 45°F and above 140°F*
    c. *below freezing and above the boiling point*
    d. *below 55°F*

12. The only water you have available to drink is taken from a stream and is suspected of being impure, you should:
    a. *throw it away*
    b. *strain it through clean cloths and drink it*
    c. *add 5 drops of household bleach to each gallon before drinking it*
    d. *boil it for 1 to 5 minutes*

13. Disease transmitted through food frequently originates from:
    a. *dirty hands*
    b. *use of bactericide or other cleaning compound*
    c. *poor storage practice while in transit*
    d. *dirty dishwater*

14. Water through which radioactive fallout has passed can be made potable by the following method:
    a. *boiling*
    b. *chlorination (household bleach)*
    c. *purification tablets*
    d. *filtering or settling*

15. If closed cans or jars containing food are lightly covered with radioactive fallout, thus causing the food to be exposed to gamma radiation:
    a. *the food is unaffected for eating purposes*
    b. *the food must be discarded*
    c. *the cans should not be handled or opened*
    d. *the food will be radioactive*

16. If radioactive fallout drops into a body of water:
    a. *the water itself becomes radioactive*
    b. *the fallout dissolves in the water*
    c. *the water itself does not become radioactive*
    d. *the water is forever "poisoned"*

17. Foods with cream fillings, custards, gravies, potato salad, ground meat, hashes, among others, are impractical to use under emergency feeding conditions because:
    a. *they are hard to obtain*
    b. *they are fattening*
    c. *they spoil easily and can make people ill*
    d. *they are difficult to serve*

18. For mass feeding, standardized tested recipes are recommended because:
    a. *they shorten cooking time*
    b. *they eliminate guesswork and assure consistently good products*
    c. *they prevent nutritive losses*
    d. *it is easier to keep the recipes in your head*

19. Enlargement of family-size recipes for mass feeding purposes is not recommended because:
    a. *the multiplication of fractions is difficult*
    b. *the proportions are affected, which in turn affect cooking time, temperature, and yield.*
    c. *all of the necessary ingredients may not be available*
    d. *there is usually insufficient time to calculate the enlarged recipes*

20. It is recommended that group feeding establishments develop and maintain a reserve supply or stockpile of foods for emergency use. To avoid waste and loss, if disaster never comes, "rotation of stock" is suggested. "Rotation of stock" means:
    a. *the food items are turned upside down periodically to prevent deterioration*
    b. *the reserve stocks are channelled into normal food service and as they are used are immediately replaced with fresh stocks*
    c. *the reserve stocks are moved away from regular supplies for annual inventory*
    d. *the reserve supplies are often inspected for dents, rust and leaks*

21. You have a very large group of disaster workers to feed in a short period. Service will be faster and more orderly if the meal is served:
    a. *at tables by well trained waiters*
    b. *at one large table using self-service buffet style*
    c. *from several similarly arranged counters to permit more than one serving line*
    d. *at scheduled intervals using a single cafeteria line*

22. In planning a mobile canteen emergency mass feeding operation (real or an exercise), having been told the number of people to serve and the time and place, indicate what group of decisions you would make first, placing number 1 by the first step, 2 next, etc.:
    ( ) *make out a quantity market order*
    ( ) *lay out the serving area and establish lines of traffic*
    ( ) *plan the menu*
    ( ) *select appropriate location for preparing the food*
    ( ) *decide what equipment, supplies and transportation are needed*
    ( ) *plan the clean-up and sanitation for areas*

MASS FEEDING IN COMMUNITY FALLOUT SHELTERS

BACKGROUND TO UNDERSTANDING FALLOUT SHELTER FEEDING

This portion is provided especially for persons who have not studied basic civil defense material, who have little or no knowledge of nuclear weapons effects, particularly radioactive fallout, and who do not know the principles of protection against fallout.

a. The facts and principles herewith presented do not include everything one should know about civil defense; rather, only those facts are presented that are pertinent to an understanding of fallout shelter feeding.
b. The general public is urged to take the entire "Personal and Family Survival" course from which much of this section is taken. This course is offered in most cities in the U.S. through the Civil Defense Adult Education Program. Completion of such a course would make this portion easier to understand, and provide additional knowledge which will help individuals and families to meet any emergency.

Why Fallout Shelters are Necessary

a. Thermonuclear bombs can produce explosions equivalent to many millions of tons of TNT.
b. A large portion of the energy in the detonation of a nuclear weapon is given off as heat radiation and blast. The remaining portion of the energy is released as the residual nuclear radiation associated with the radioactive materials from the explosion. These materials and other debris rise with the ascending mushroom cloud, and return to earth as *fallout.*
c. Only nuclear explosions produce nuclear radiation.
d. Nuclear detonations at or near the surface of the earth result in the formation of a great quantity of local fallout composed of particles of radioactive debris.

e. The particles of fallout, which range in size from coarse to fine sand or table salt, are highly radioactive. The lighter particles drift with the upper winds and fall in an irregular pattern that may extend for several hundred miles.
f. Fallout distribution is determined by the direction and speed of the wind from the surface to high altitudes above the surface.
g. As much as 80 percent of the radioactive material from a land-surface burst of a nuclear weapon may return to the earth as early fallout within the first day.
h. When large amounts of radiation are absorbed by the body in short periods of time, sickness and death may result. This is why fallout shelters are necessary for protection from fallout radiation.

Protection Is Provided by All Levels of Government

a. The Secretary of Defense has said: ". . . fallout shelters should have the highest priority of any defensive system because they decrease the vulnerability of the population to nuclear contamination under all types of attack."
b. For most of the population, community shelters provide the best answer to fallout protection.
c. Basically, civil defense in the United States is civil government—Federal, State, local—prepared for effective action to limit damage and speed recovery in the event of attack.
d. Civil defense (civil government) directs and coordinates the use of the best available fallout protection; directs and coordinates the public and private emergency service organizations and other resources available to the community for the protection of life and limitation of damage to property —and then to make emergency repairs to enable the community to return to normal.
e. In civil defense, each level of government does that part of the job it can do best. The Federal government (The Office of Civil Defense, Office of the Secretary of the Army) is responsible for developing the national program, carrying out work which can best be done nationally and giving assistance and guidance to State and local governments in carrying out their part of the National Civil Defense Program which is essential to our total national defense requirements.
f. The basic function of the State or local civil defense director is to complete the fallout shelter system and plan for and coordinate the special actions of other units of government during emergency, both nuclear attack and natural disaster.

This is done under the supervision and authority of the governor or local elected executive.
g. Many communities have developed civil defense operating plans, and have assigned employees of their government to disaster duties with departments having emergency responsibilities. For example, State or local welfare departments may be ready to train employees or others in the field of emergency mass feeding. This course material, having been developed by the three sponsoring national organizations, is available for this special purpose.

Characteristics of Radioactive Fallout

a. The greatest danger from fallout is the effect of gamma radiation, since they have long range and are extremely penetrating. They are invisible, similar to X-rays.
b. Radiation given off by the particles cannot be detected by any of the human senses. Radiation cannot be seen, heard, smelled, tasted or felt: special instruments must be used to detect and measure it. However, fallout in amounts considered significant for civil defense purposes will look and behave much like sand or dirt, and like them, it can be seen or felt. Thus, in many cases, the physical senses can be relied upon to determine whether or not a serious fallout hazard exists. For operational purposes, the use of radiological instruments will be required to determine the radiation intensity. There are various types of radiation-monitoring instruments. These include dosimeters, which show total radiation exposure of persons; and survey meters, which show the rate of radiation. Radiological monitors are persons specially trained in the use of these instruments.
c. Nuclear radiation (mostly gamma rays) from fallout can damage living things, but it cannot make anything radioactive. Thus, if fallout particles are on the body of a person or animal, instruments may detect nuclear radiation coming from that contamination; but, if the fallout particles are removed, no radiation will be detected as the body itself does not become radioactive.
d. If radioactive fallout drops into a body of water, the water itself does not become radioactive. After the fallout has settled to the bottom or has been removed by filtration and other normal processing, the water is not radioactive. The same principle applies to water in storage tanks, or to food in cans or other containers. It also applies to air, which is not "poisoned" in any way by radiation passing through it, any more than the air in a doctor's office is poisoned by

the X-rays which pass through it when he takes an X-ray of a patient.

e. In a fallout area, the amount of gamma rays reaching the body can be reduced to acceptable levels by putting enough shielding (mass) between a person and the source of radiation. In general, the denser the material, the less thickness is required for shielding. If the shielding is thick enough and dense enough, it would cut gamma radiation to such a low level that it would do little harm. This is why larger buildings with heavy walls or an underground space are most suitable for fallout shelters.

f. Radiation intensity from fallout builds up during the time the particles are being deposited. Radiation then decreases with time: that is, the radiation level, as measured in roentgens per hour, drops lower and lower. The decrease is rapid at first, and much slower later on. This falling off of intensity is due to what is termed "radioactive decay."

g. It must be emphasized that the radioactivity in fallout cannot be destroyed. Neither boiling nor burning, treatment with chemicals, nor any other action will destroy or neutralize radioactivity. Because of radioactive decay, fallout will become less harmful with the passage of time, but there is no known way to speed up the decay process.

h. Protection from external radiation exposure can be accomplished by a combination of three ways: shielding, distance, and time, defined as—
   (1) Shielding (shelter).
   (2) Distance (distance from radiation source), or removal of radioactive materials (decontamination).
   (3) Exposure control (combination of 1 or 2 above, with time-scheduled exposures). (Radioactive decay is also a function of time.)

   In a fallout area, shielding is the most dependable means of protection. Shelter places mass between people and the source of radiation. By keeping the fallout outside, shelters also provide some protection by distance. People should remain in shelter until the radiation has decayed to acceptable levels, as determined by specialists.

THE NATIONAL FALLOUT SHELTER SURVEY

1. Fallout shelters are necessary because they provide protection against the widespread danger of fallout. While individual shelters will protect some of the people in your community, the major part of the local population will need protection in community shelters. For this reason, American communities are devoting much of their civil defense effort to the marking, stocking, inspecting, and organizing of community shelters. Such shelters will provide fallout protection for large groups of people if and when the need arises.

2. The national survey located existing buildings with fallout protection, and computer printouts with this information were sent to State and local governments. Then came the job of preparing to make effective use of this protection as public fallout shelter space. The first step in this process was development of a unique agreement, or "license," involving the building owner, the local government, and the Federal government.

3. Under the license, the building owner allows his building to be marked as a public fallout shelter for use in a national emergency, and also to be stocked with austere survival supplies provided by the Federal government. The building owner receives no payment as a result of this agreement, even though he may be setting aside valuable storage space for the survival supplies. His is a direct personal contribution to the defense of the Nation.

Community Shelters

a. For most of the population, community shelters provide the best answer to fallout protection. People away from home at the time of an attack should have immediate shelter available.

b. As a member of a group, a person may better face the problems of shelter living. People could expect to find more special skills, for example, medical skills or mass feeding specialists, represented within a group of many persons.

c. Community shelters may consist of shielded space in the inner core area of tall buildings, in a basement, in underground chambers, in subways, or in other suitable space. The exact nature of the space or design may vary greatly. Public fallout shelter requirements are: a minimum fallout protection factor (PF)* of 40; space for at least 50 people at 10 square feet per person; and adequate ventilation.

d. A community shelter should provide the minimum essentials required to support life for 2 weeks. This time has been accepted as the basic in-shelter planning criterion.

e. To meet survival needs during shelter occupancy, the civil defense program provides austere supplies for all licensed

* A fallout protection factor expresses the relationship between the amount of fallout radiation that would be received by an unprotected person compared with the amount he would receive if he were inside shelter. As a general example, a completely unprotected person would be exposed to 40 times more radiation than a person inside a shelter with a fallout protection factor of 40.

public shelters. These include food, water containers when needed, medical and sanitation items, and radiation-detection instruments. The suitability and adequacy of these supplies have been established in consultation with recognized experts, including the Advisory Committee on Civil Defense of the National Academy of Sciences—National Research Council, the Public Health Service of the Department of Health, Education, and Welfare; and the armed services; and demonstrated by a series of experiments in which men, women, and children have lived up to 2 weeks in fallout shelters stocked with these supplies.

FALLOUT SHELTER SUPPLIES

1. The Federal program for provisioning shelters is directed toward furnishing basic necessities to all shelter occupants.

2. Basic necessities have been determined and standardized. Supplies and equipment for stocking licensed public fallout shelters are furnished by the Office of Civil Defense to local governments.

3. Placement of the supplies in a location accessible to each shelter, and filling the water containers are responsibilities of the local government.

Federal shelter supplies are:

a. Food—a wheat-flour base biscuit, cracker or wafer. Five (5) pounds (10,000 calories) of survival rations per shelter space.

b. Food—carbohydrate supplement contains sucrose, glucose and flavoring.

c. Water—steel drums with a double polyethylene bag liner. Each drum will hold 17½ gallons, enough in each shelter to provide 14 quarts per person. (2 weeks)

d. Sanitation kits contain essential items packed in a 17½ gallon fiber drum. The fiber drum with plastic seat and polyethylene liner is used as the first commode. As the water drums are emptied these in turn are used as commodes. Instructions for setting up the commode are contained in the sanitation kit. Instructions are also printed on the steel drum. When filled to the sanitary fill line (15 gallons), the commode may be expected to weigh over 100 pounds and should be handled carefully to avoid spilling. The filled liners shall not be lifted from the containers. Included in the sanitation kit also are quantities of toilet tissue, sanitary pads, commode chemical, water cups, plastic gloves, can opener and other items.

e. The medical kit components were selected on the basis of recommendations and consultations with the U.S. Public Health Service, the Department of Defense, and the individual military services. The medical supplies are intended to provide means of treating ailments and alleviating suffering by checking the transmission of disease, controlling emotional stress and disease symptoms. The materials are intended to serve the emergency needs of generally normal persons.

f. Radiological monitoring kits: instruments are to be used for locating the best shielded portion of the shelter, and to determine when it is relatively safe to leave the shelter for limited periods.

Local Government Supplementary Supplies

Local government may supply community fallout shelters that are not stocked under the Federal program and may supplement Federal shelter stocks.

a. Supplementary supplies to improve the habitability or utility of public shelters are desirable. These might include a greater variety and quantity of food, additional supplies of water, medicines, sanitary items, bedding, clothing, and/or communications equipment, and other items.

b. In places where supplementary food is stocked, provisions should be made for preparing, serving and cleaning up of the particular kinds of food in stock. Stated another way—supplementary food should be selected for each individual shelter with the knowledge that water may be in short supply, or that there may be no means of cooking or washing utensils, if such is the case.

c. Supplementary items, however desirable, should be considered nonessential if their storage will limit the space available for occupancy.

d. Local governments are responsible for the proper storage and safekeeping of all public fallout shelter supplies and for establishing the necessary food and water distribution arrangements within the shelters.

FOOD IN FALLOUT SHELTERS

The purpose of provisioning fallout shelters

1. The purpose of provisioning fallout shelters with food is to provide basic requirements during the shelter stay so that occupants can resume active and productive lives upon emergence.

2. Given an adequate amount of drinking water, a human being can survive without food for many days provided physical effort is limited. Body tissues are slowly consumed as sources of energy. Continued deprivation, obviously, will result in serious loss of weight and progressive weakness. Simulated shelter occupancy experiences have demonstrated that normal persons can subsist for periods up to 2 weeks under sedentary conditions on a survival ration of 700 calories per day.

3. Fortification of survival rations with vitamins is not considered necessary. Deficiency of calcium, phosphorus, or potassium also will not lead to deterioration during the limited period of shelter occupancy. The small amount of salt necessary to conserve body water is provided in the survival ration.

The basic food ration

The basic food ration established by the Office of Civil Defense for provisioning approved public shelters is 10,000 calories per shelter space.

Basic requirements for shelter food were originally established by a Federal Inter-departmental Advisory Group on Food for Shelters. These requirements are that the food be palatable or at least acceptable to the majority of the shelter occupants; have sufficient storage stability to permit a shelf life of 5 to 10 years; be obtainable at low cost; be widely available or easily produced; have high bulk density to conserve storage space; require little or no preparation; and produce a minimum of trash volume.

Food items stocked in shelters

There are four food items stocked in shelters throughout the Nation. Any one, or a combination of them, may be found in a shelter.

a. Survival biscuit. A wheat flour baked product containing small amounts of corn and soy flour.
b. Survival cracker. A wheat-corn baked cracker, similar to the survival biscuit, except that it contains more corn flour and no soy flour.
c. Bulgur wafer. A wheat-base cereal product. The bulgur is parboiled, puffed, dried, and compacted into wafer form.
d. Carbohydrate supplement. Adopted from a standard product in accordance with a military specification, and contains sucrose, glucose, and flavoring.

The physiological fuel value of the above biscuits, crackers, wafers, and carbohydrate supplement is nearly the same for all products and is approximately 2,000 calories per pound of dry matter.

Nutritional needs require that the carbohydrate supplement be used with the other products in a ratio of not more than one-third by weight of the carbohydrate supplement to two-thirds by weight of cereal products.

Crackers and biscuits have been processed in various shapes and sizes. Some are single pieces, others, two or four pieces, segmented, baked together. Each segment is a "piece." This is important to remember in calculating the calories in a single piece. A segment of cracker or biscuit, or a single bulgur wafer constitutes one piece. (See Figure 1.)

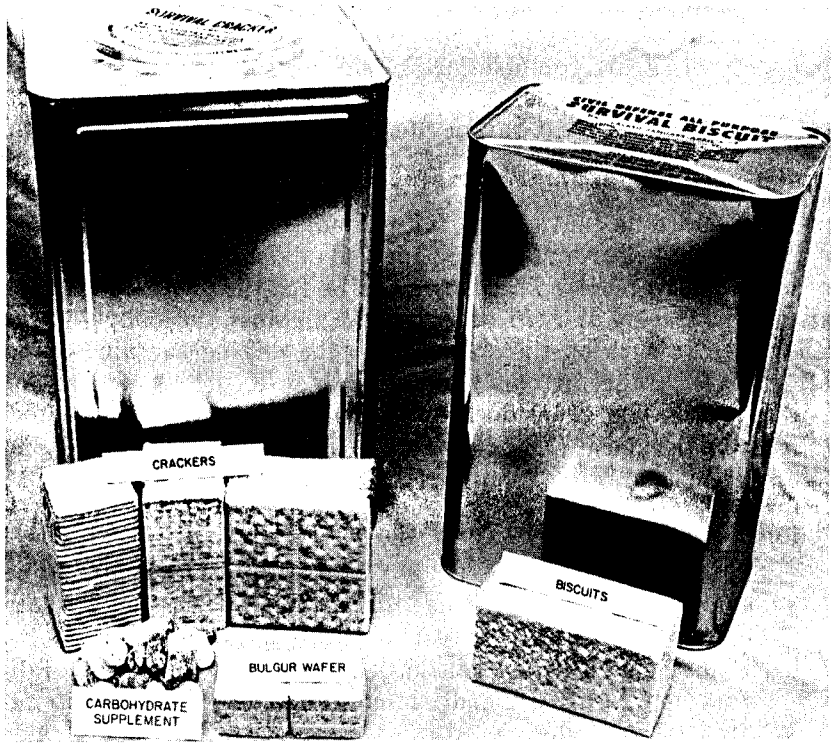


FIGURE 1.—Shelter food items.

The numerous food contractors package their products in various sized packages. This is necessary since biscuits and crackers are baked and the wafers are pressed products, production methods differ, dimensions differ, and therefore the poundage and pieces per container differ. *The net weight and the approximate number of pieces in each container are marked on the outside of the can.*

The carbohydrate supplement food item also varies dimensionally in size and pieces per pound.

Calculation of Daily Food Ration

Since there are approximately 2,000 calories per pound (survival biscuit, cracker, wafer or carbohydrate supplement) we can calculate the caloric value of each piece. The net weight and approximate number of pieces in each container are marked on the outside. For example: one contractor supplies crackers in a 5-gallon can with net contents marked 12½ pounds and approximately 1,200 pieces. How many calories in each piece? Calculation: There being 2,000 calories per pound, there are in this container 25,000 calories (12½ x 2,000). Then to find the number of calories per piece, divide 25,000 by 1,200 (pieces); this equals 20.8 calories per piece. Use the round figure of 20 calories to determine the rations. In this example, 12 pieces of cracker would provide 240 calories, one meal. Daily ration (3 meals) would equal 720 calories.

Rations for Infants

If there are no ingredients for formula for infants, biscuits or crackers could be crumbled very fine and mixed with water to make a thick liquid (gruel). The baby could be fed the gruel with a teaspoon, by placing the tip of the spoon against the baby's lower lip so he can suck on the spoon. Keep the mixing containers and other materials scrupulously clean between feedings and use for nothing else. The gruel does not necessarily have to be heated.

A 24-hour calorie allowance for a baby will vary according to age, weight, and other factors from 500 to 1000 calories.

Supplementary Foods Are Not Equivalent Foods

a. Supplementary foods, as used here, are those which may be stocked *in addition to* the full allotment of the wheat-base cereal and hard candy (carbohydrate supplement).

b. Equivalent foods are considered a *substitute* for public fallout shelter rations, and as such, must meet certain standards in order to be used in an approved public shelter. See paragraphs f and g.

c. *Selecting supplementary foods*

Supplementary foods should be selected that are:

(1) Palatable and widely acceptable.
(2) Familiar to the majority to be fed.
(3) Simple and inexpensive.
(4) Suitable for all age groups.
(5) Easy to store, prepare, and serve.

(6) Low in protein content and not too highly concentrated especially if water supply is limited.
(7) Stable in storage, having a shelf life of from 5 to 10 years.

d. Supplementary food items must be selected upon the basis of the following special considerations and limitations:

(1) Costs of surveillance and replacement during the standby period.
(2) Storage must not reduce occupancy space.
(3) The production of heat (for cooking), steam, smoke and fumes could create serious problems in a fully occupied shelter.
(4) Equipment and utensils require storage and servicing.
(5) Disposal of additional waste and trash.

e. Food supply should include items likely to be needed by infants: dried skim milk or canned milk, baby foods, baby cereal, feeding formula ingredients for bottle-fed babies and the proper equipment for infant feeding.

f. *Requirements for use of equivalent foods*

Public fallout shelters qualifying under the Federal program are provisioned with supplies in accordance with established standards. The standard amount of food furnished is 5 pounds per space consisting of biscuits, crackers, wafers, and carbohydrate supplement or combinations of these products.

g. The State or local civil defense director, or other assigned officials, may reduce the amount of the standard ration to be placed in the shelter, primarily where lack of storage space presents a problem, if equivalent food is available in the shelter area and certain other requirements are met. These requirements are as follows:

(1) Food available will furnish at least 10,000 calories per rated space. A calorie conversion table for a few foods, as examples, is furnished below.
(2) Food is expected to be available for use by the shelter occupants when shelter occupancy is required.
(3) Processing and serving requirements are minimal and required utilities, or substitutes, are available.
(4) Food is accessible to shelter area and protected from contamination.
(5) Food is nonperishable over a period of at least 14 days without refrigeration.
(6) Additional water which might be necessary for preparing or reconstituting foods is available.

CALORIE CONVERSION TABLE

Canned Foods	*Approx. Calories per lb.*
Bacon	3,144
Beef, w/gravy	880
Beef, w/veg.	600
Franks, w/beans	723
Fish	1,318
Peanut butter	2,615
Beans	83
Carrots	128
Corn	302
Peas	307
Potato, instant	1,619
Hominy	1,642
Coffee or tea, soluble	—
Packaged Foods	
Corn Meal	1,650
Milk, nonfat, dry	1,643
Cheese, processed	1,680
Macaroni Products	1,712
Margarine	3,269
Dessert powder, w/cornstarch	1,724
Gelatin	1,520
Sugar, granular	1,748

h. Rules concerning the type and amount of supplies that persons can bring into a public shelter are established by the local government. Plans should be made for inspecting foods brought in to determine their usefulness and storage capability. Foods which are perishable must be given special treatment—either used immediately, if still edible, or discarded, if there is not suitable refrigeration. Persons who have special dietary needs must bring their own food. Likewise, mothers with young infants, should bring the necessary formula ingredients and equipment, unless it is certain that the shelter food stock includes these items.

WATER PROVISIONING

Potable Water

1. The requirement for a supply of potable water necessary for survival constitutes one of the fundamental problems in achieving shelter habitability. A minimum of 3½ gallons for each shelter space stocked should be available. This amount must be furnished either from sources available to the shelter or from water storage containers.

2. Potable water may be furnished to the shelter from a variety

of sources. These include entrapped water in building systems, wells, tanks, steel drums with plastic liners as furnished for public fallout shelters by OCD, gravity-flow community systems, or a combination of any of these sources.

3. Systems which may be expected to contain either potable or nonpotable trapped water are listed below. A positive determination of potability must be made for each separate system. Information on the availability of trapped water in shelter facilities is being obtained in the continuing updating of the national fallout shelter survey.

- Fire control tanks
- Sprinkler systems
- Hot water heaters
- Supply pipes
- Holding and gravity tanks
- Water closet flush tanks
- Air conditioning or chilled water systems
- Heating tanks and systems
- Indoor swimming pools
- Hydraulic elevators using water
- Reflector pools within building

Stored Water

The water container furnished by the Office of Civil Defense for public fallout shelters consists of a 17½-gallon steel drum and a double 4-mil polyethylene liner. (See Figure 2.) Detailed instructions for filling the containers are provided in a pamphlet which is packed with the polyethylene liners. These instructions require that the water used be from a source approved by the State and local health departments; that the greatest care be exercised to assure sanitary conditions during the filling operation; that the filling procedure be under the care of a State or local health department sanitarian; and, as an extra precaution, that one to two teaspoonfuls of liquid household bleach (active ingredient 5.25% sodium hypochlorite; 94.75% inert ingredients) be added to each drum. An equivalent to the liquid bleach in solid form is also acceptable where approved by the local health authorities concerned.

Instructions for dispensing the water provide for addition of iodine purification tablets to each 17½-gallon container. These tablets are furnished by OCD in the medical kits. This treatment provides further assurance that the water is suitable for drinking.

Data assembled by the U.S. Public Health Service on the chemical quality and bacterial content of water stored in public fallout shelters over a one-year period reaffirmed that storage of water from approved public water supplies, under controlled filling conditions, and in the container provided by OCD, is a safe practice.

Testing of stored water is considered necessary only where exposure to abnormal environmental conditions such as flooding, fire,

FIGURE 2.—Shelter water container.

or accident, has occurred, or where surveillance inspection or observation of the shelter indicates a condition likely to result in contamination. Tests for bacterial and chemical quality control may be necessary. The responsible local official should establish the need for tests and arrange for their performance.

DISTRIBUTION METHODS

1. Food and water may have to be carefully regulated by the shelter manager to insure that they will last as long as necessary. The quantity of food and water to be issued for each meal must be determined by the shelter manager on the basis of the anticipated period of occupancy and the actual number of shelter occupants. Food rations should be about 250 calories per meal. Water rations should consist of about 5 cups per day, or about 1 quart per person. This strict control over food and water should last only as long as necessary and may be relaxed when more information indicates a probable shorter length of stay.

2. Feeding specialists may be asked to advise the shelter manager as to the quantity of food and water to be issued. To do this, an accurate and complete inventory of all food stocks and water supply must be taken the first day. The shelter manager should have an accurate count of the number of occupants. For early planning purposes, the food can be inventoried by pounds: five pounds of the Federally stocked foods per person are needed, assuming a 14-day stay, as well as 3½ gallons of water per person.

3. The biscuits, crackers, or wafers and carbohydrate supplement should be apportioned for 3 meals per day and be distributed at meal times. Issue no more than can be eaten at one meal time. Some water should be dispensed at meal times, using the 6-oz. cups which are provided in the sanitation kit. Cups should be labeled, if possible, with the owner's name, and used exclusively by him.

4. Space will dictate where people are fed. In general, fallout shelters will be too crowded to provide separate eating areas. Where the ration is only the OCD furnished food items there will be no particular need for separate feeding areas. If supplementary foods are to be served, separate feeding areas should be provided, if possible. There are several ways of distributing food and water. Shelter space and configuration vary, so the method which seems the simplest will work out best:

a. Stationary (or centralized) service. People are brought to the food and water, cafeteria style. More than one distribution point may be set up.

b. Sectional (a combination of centralized and decentralized service). Food and water are issued to leaders of each shelter group who then return to their respective groups and serve it. This may be preferable with large numbers of shelter occupants.

c. Moving (or decentralized service). Food and water is brought to the people. This method is practical for the dry biscuit rations, but it probably is impractical to dispense water by this means.

d. Special arrangements for serving the ill or injured, and infants will be required.

Distributing Food

A precise calculation of calories per meal or the issue of fractional parts of one piece is not necessary.

Recommended issuances

Using averages for sizes and weights, and disregarding small variations, the following issues are recommended:

If stock consists of wheat-base food only, (a), (b), or (c) will provide a meal for one person:

	No. of pieces to issue	Calories
(a) Crackers or biscuits from 5-gallon can	12	250
(b) Crackers or biscuits from 2½-gallon can	8	250
(c) Bulgur wafers from 5-gallon can	3	250

If stock consists of wheat-base food *and* carbohydrate supplement, (d), (e), or (f) will provide a meal for one person.

	No. of pieces to issue	Calories
(d) Crackers or biscuits from 5-gallon can	8	
and		250
Carbohydrate supplement	4	
(e) Crackers or biscuits from 2½-gallon can	6	
and		250
Carbohydrate supplement	4	
(f) Bulgur wafers from 5-gallon can	2	
and		250
Carbohydrate supplement	4	

(The carbohydrate supplement is not suitable as the sole shelter food)

Distributing Water

Water containers weigh about 150 pounds when filled. This will require a few strong men on the feeding team to handle these. Handling problems are eased by use of the siphon system. The water can be siphoned from the top drum in the stack, thus obviating movement until most of the water has been dispensed.

a. *Steps to follow in dispensing from drums*

When water from the drums is to be used for drinking purposes, the steps listed below should be followed:

(1) Remove:

(a) The water purification tablets (iodine) from the medical kit.

(b) The dispensing spout, plastic cups and lids from the sanitation kit.

(c) The water drum cover.

(2) Unfasten wire ties on both outer and inner bag liners and drop 10 water purification tablets into the spout of the inner bag. Retie inner spout securely.

(3) Replace the drum cover and wait five minutes.

(4) Remove the drum cover, untie spout and insert siphon tube about ¾ of its length through the spout of the inner bag. Agitate water with siphon tube for 30 seconds.

(5) Fasten tube in place by wrapping both spout and tube with the wire. Tie and replace the drum cover.

(6) Wait 20 minutes.

(7) Remove drum cover, unfasten wire tie, pinch end of siphon tube and pull down about 18 inches. Release of pinch pressure will start the flow of water.

(8) Start filling of individual cups.

(9) If the water in the first cups filled has noticeable strong iodine color and strong odor, pour it into an accessory container, (use for washing hands) pinch the end of the tube to avoid loss of siphoning action and agitate water with tube in drum for 30 seconds.

(10) Resume filling individual cups.

b. *Allocation when quantities are limited*

If additional potable water is available, but in limited quantities, FIRST—set aside an adequate additional amount (perhaps 1 quart per day per person) for drinking; SECOND—if any person is suspected of having radioactive fallout on his skin, wash with soap and water; THIRD—the next most important use of water is for washing hands.

SANITARY PRACTICES IN SHELTER FEEDING

1. An important function of a fallout shelter staff will be to maintain the general level of good health of the shelter occupants.

2. Water and food-borne disease can be prevented by maintaining food service sanitation at a high level. But there are situations likely to be encountered in fallout shelters which should be noted so that extra precautions pertaining to sanitary practices can be taken:

a. Shelters are likely to be crowded resulting in small and compact food service and storage areas. Extra effort will be needed to keep these areas clean, protected and uncluttered.

b. Water supply may be severely limited to the extent that food workers and occupants cannot wash hands as often as customary.
c. Food stocks are likely to be limited, and hence, must be properly conserved, protected and controlled to avoid waste, spoilage and contamination.
d. Refrigerated storage facilities will not likely be available.
e. Dry food stocks may require extra care in storage to keep them clean and protected against dampness, rodents, pests and insects.

Rules for Food Workers

a. If water for washing is unavailable, wipe hands thoroughly with clean paper or tissue and keep hands away from face and mouth when preparing and/or issuing food.
b. Wash or disinfect hands especially after using the toilet and after handling germ-carrying materials.
c. Prepare and serve food in the same safe and sanitary manner required under normal conditions, to the extent possible.
d. Keep all unauthorized persons out of the food service areas.
e. Keep all foods not in use in the storage area. Keep storage and the food service areas clean and orderly.
f. Store food and food service equipment as far as possible from the toilets and the areas where cleaning equipment is kept.
g. Protect food against flies, rodents, roaches, fleas and lice.
h. Dispose of waste, trash and garbage after each meal, in accordance with the shelter management plans.

Washing and Sanitizing Containers

If public shelters are stocked only with the survival biscuits, crackers or wafers and the carbohydrate supplement, there will be no need for dishes and eating or cooking utensils, hence no problem of sanitizing the containers. If supplementary food is to be used, there will be need for containers which require washing and sanitizing. For sanitizing purposes the shelter supplementary stocks should include liquid household bleach. For recommended method see Sec. 3, Page 79.

a. Single-use plates, cups, knives, forks and spoons are recommended.
b. Where conventional dishes and utensils are used they should be washed and sanitized. If hot water and soap are unavailable, extra effort must go into scraping, washing off and sanitizing. They are drained until dry and stored.

Waste and Trash Disposal

a. During the early stage of fallout shelter occupancy, there is danger in exposing people to radiation just to carry waste and trash outside.
b. Special measures must be taken in the storage and disposal of waste, within the shelter, or at least in an area where persons carrying the waste will not be dangerously exposed.
c. Survival foods are wrapped in waxed paper, cellophane or foil, and placed in metal containers which are packed into fiberboard boxes. A can opener is in the sanitation kit. When metal containers are emptied, they may be used as trash receptacles, or to sit on, or if space is needed, crushed flat and laid aside.
d. The fiberboard boxes may be opened out flat and used for insulation on the floor.
e. Containers, boxes and cans which are useless should be flattened and stacked in an out of the way place until it is safe to remove them completely.
f. Liquid waste and garbage should be covered and moved as far from the occupied space as possible.
g. Cans or boxes which may have food residue on them should be flattened and placed in a covered garbage can or in a plastic bag to keep insects or pests from gathering.
h. Following is the technique for small can disposal:
   (1) Completely cut out top and bottom of empty can.
   (2) Step on the can and partially flatten it.
   (3) Place the cut-out ends inside the can and fully flatten.
   (4) Place in a container for cans and keep the container closed.

NOTE TO READER: The preceding section covers the subject of feeding in a community fallout shelter. There are many readers who may be interested in stocking their own family shelter. To these persons, we again remind them of the course, "Personal and Family Survival." Many vital facts concerning foods that a family should stock in a shelter are taught, as well as how shelters may be improvised. This and a great deal more information about civil defense than is possible to give here makes this course one that every citizen should take. The reader is also urged to obtain and use the publication "Family Food Stockpile for Survival," Home and Garden Bulletin No. 77, U.S. Department of Agriculture. This is available from most State and local civil defense offices, county agents, or Superintendent of Documents, U.S. Government Printing Office, Washington D. C. 20402. Price ten cents.

The remainder of the handbook is primarily directed to mass feeding in disasters caused by nature rather than a disaster caused by an enemy nuclear attack. The meaning of "shelter" in the context of "fallout shelter" is quite different from "shelter" provided through Red Cross disaster services for homeless victims of floods or other natural disasters. The "fallout shelter" will

protect people from radioactive fallout; Red Cross shelters are selected to protect people from the natural elements, rain, cold and wind. When the term "shelter" is used in the remaining portion of the text, it means Red Cross or welfare shelter. This next portion is intended primarily as a guide for the conduct of mass feeding operations by Red Cross volunteers in natural disasters and by Emergency Welfare Services in the postshelter period when radiation from fallout is no longer a danger.

FEEDING SERVICES IN DISASTER

IMPORTANCE OF FOOD IN A DISASTER

1. Feeding for those whose lives have been disorganized by disaster and who are unable to provide for themselves is more than a means of relieving hunger and sustaining life. Food is a vital factor in raising and maintaining the morale of those forced from their homes by floods, explosions, hurricanes, tornadoes or other catastrophes, of those involved in rescue, evacuation and the protection of life and property, and of those under particular stress because of the effects of disaster.

2. Human beings react in much the same way to shock, tension and stress. Many become dependent. They want to talk, to be comforted, to be given something—a blanket, a cigarette, a cup of coffee—anything that conveys the feeling of being cared about and looked after.

3. Food is a powerful social symbol as well as a symbol of security.

4. There is something about eating that eases tensions and calms anxieties. An alert and efficient team, on the spot with refreshment, fills an important psychological as well as physical need.

5. Food in a disaster doesn't have to be fancy nor be served with frills. It should be simple, suitable and speedily provided and there should be enough of it.

6. Food service workers can help morale immeasurably by being good and sympathetic listeners.

PROBLEMS OF DISASTER FEEDING

1. A program for the emergency feeding of victims of a natural disaster calls for large-scale planning; planning for emergency feeding in the event of an enemy attack will present a

greater number of problems. Both situations from the standpoint of emergency feeding involve plans:

a. To keep people alive.
b. To restore and maintain morale.
c. To provide food that will keep people at work or get them back to work.

2. The common problems to be met in disaster feeding include:

a. Planning for the large numbers to be fed under adverse conditions.
b. Giving consideration when possible to groups having special food needs—such as infants, the sick and injured, the aged, the chronically ill and others.
c. Establishing the type and place of feeding to meet the disaster conditions; for example, shelter feeding facilities, feeding stations for evacuees in transit, feeding from mobile kitchens and canteens, feeding at central kitchens using either existing or improvised facilities and equipment.
d. Organizing, preparing and serving meals *quickly* often with limited supplies of food, fuel and water—and sometimes with the further handicap of lack of transportation and communication.

3. Normal food service procedures of eating places may have to be adapted to meet the disaster situation. It may be necessary to:

a. Feed continuously around-the-clock
b. Convert the establishment to a disaster set-up
c. Expand efforts to meet the larger disaster needs
d. Set up special sanitation measures
e. Serve easily prepared foods acceptable to most people and not subject to easy contamination
f. Feed infants and other special groups
g. Prepare food for serving elsewhere
h. Improvise food service and other equipment on which food service depends

METHODS OF DISASTER FEEDING

Methods Adapted to Conditions

a. In a disaster, normal feeding operations are adapted to meet different conditions.
b. A single feeding method or a combination of methods may be necessary.

Indoor (Shelter) Feeding

a. The first facilities to consider for disaster feeding are those

eating places already existing in a community. They usually require very little alteration for disaster feeding operations.

b. Schools, churches, lodge and other community halls are typical of places having feeding facilities. These are also often chosen as safe places of shelter.
c. Restaurants, cafeterias, clubs, terminals and other large commercial eating places may be established as central feeding stations when the number of people to be fed exceeds the capacity of mobile units and shelters. People who remain in their homes but are unable to prepare their own food, because of the loss of food equipment and utilities, may have to be fed at such central feeding stations.
d. Small restaurants, roadside diners, catering firms with limited serving capacity may be used as auxiliary kitchens for preparing food for delivery and service away from the premises.
   (1) The food service personnel associated with these facilities are already organized, accustomed to working together and are familiar with their own set-up and equipment.
   (2) These experienced workers can serve as first line disaster feeding volunteers to prepare and serve meals for the victims and emergency workers in their community.
e. Buildings without feeding facilities that may be suitable for temporary care or shelter of disaster sufferers may be equipped as necessary for food service.

Mobile Feeding

a. Need
   Preparedness for mobile feeding is an important part of the disaster programs of communities. This is the type of food service that is quickly provided for disaster workers and victims at or near the disaster scene and in out-of-the-way places.
b. Mobile feeding services may be required to:
   (1) Provide snack type meals for a brief period immediately following the disaster.
   (2) Provide group meals for an indefinite period until permanent feeding services are possible.
c. Mobile feeding units may be set up to bring food to:
   (1) Displaced persons awaiting assignment to protective shelters or other emergency lodging.

(2) Victims who have remained in or returned to their homes but are unable to prepare food for themselves.

(3) Persons being evacuated from the disaster area.

(4) Rescue and other disaster workers who perform vital rescue and restoration services and are unable to leave their posts or go to a feeding center.

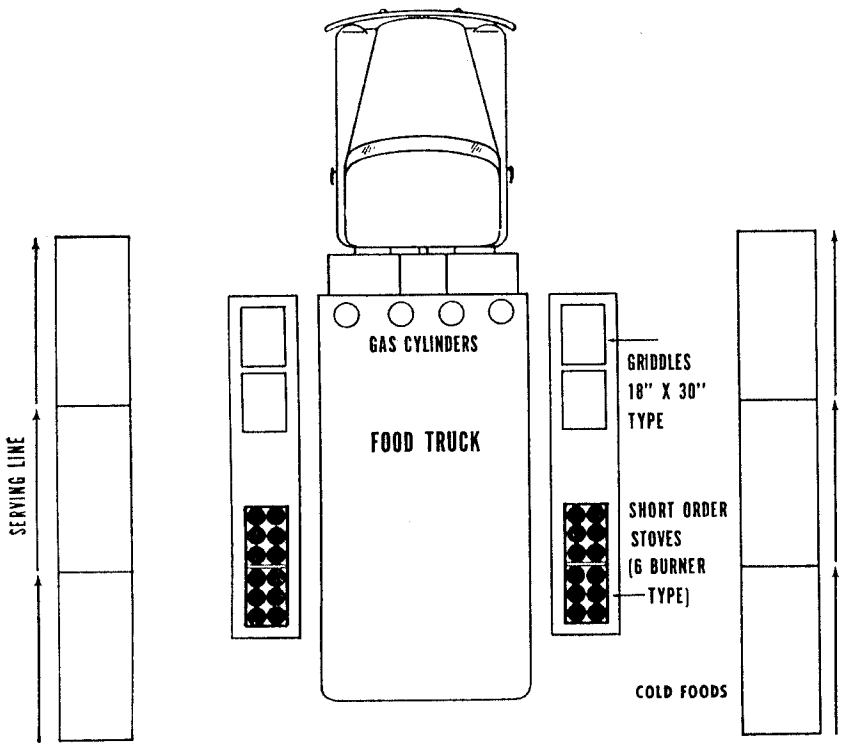


FIGURE 3.—Layout of improvised mobile kitchen.
(using flat bed-stake body truck)

d. Mobile feeding units may be of two types.

(1) A unit fully equipped to store, prepare and serve food. (May be a single vehicle or a number of vehicles.)

(2) A unit equipped only for serving food that has been prepared elsewhere.

e. Mobile feeding facilities need not be expensive.

A variety of standard vehicles ordinarily found in every community may be converted and equipped to serve as mobile feeding units. Examples are:

(1) Commercial trucks
(2) Military trucks
(3) Bread trucks
(4) Caterers trucks
(5) Postal trucks
(6) Station wagons and private cars and miniature busses

f. *Mobile kitchen*

A mobile kitchen is a one-vehicle, self-contained transportable unit capable of operating independently. It is equipped to prepare and serve food at any location and carries its own storage for water, fuel, and food supplies. See Figure 3.

Suggested equipment for an improvised mobile kitchen

EQUIPMENT FOR FOOD PREPARATION

Essential equipment	*For 200 diners*	*For 500 diners*
Burner plates, propane gas or Oil stove or trailer stove	2-burner	2 2-burner
Stock pot (6-gal.) (may be used for making soup or coffee)	2	2
Dish pan, 18-inch	3	6
Saucepan (1-qt.) for dipping (lipped)	2	2
Water pails (3-gal.) to be used for water only	3	3
Covered garbage can or pail	2	3
Graduated 1-qt. measure	1	1
Knives:		
Bread	2	2
Butcher	2	2
Paring (some with loop handles)	4	6
Sandwich spreader, 8-inch	4	4
Measuring spoons and cups	1 set each	1 set each
Large stirring spoon	3	4
Can opener (wall or table type)	1	1
Vegetable brush	2	3
Desirable to extent available		
Simple coffee urn (10-gal.) with bag, ring, and faucet made to sit on single burner, hot plate or gas stove	2	2
Mixing bowls (9-qt.)	3	4
Frying pan, 9-inch	2	2
Cook's fork, 18-inch	2	2
Food chopper (3-lb. capacity)	1	1
Cutting board for sandwiches (2- by 18- by 12-inch)	2	2
Household bleach (to purify water)	As needed	As needed

EQUIPMENT FOR TRANSPORTING FOOD

Essential equipment	*For 200 diners*	*For 500 diners*
Water tank (if portable water supply is needed)	400 gal.	1,000 gal.
Milk cans or insulated containers	1 or more depending on size of can and amount of food to be transported.	
Baskets, boxes, or pans for transporting and serving sandwiches	4	6
Desirable to extent available		
Cover for sandwiches	As needed	

EQUIPMENT FOR SERVING FOOD

Essential equipment	*For 200 diners*	*For 500 diners*
Coffeepot (2-gal.)	4	4
Soup ladles (8-oz.)	2	2
Cups, plates, bowls, spoons, forks	For 200	For 500
Desirable to extent available		
Cream pitchers (1 gal.)	2	2
Sugarbowls	2	2
Folding tables	2	2

EQUIPMENT FOR CLEANING

Essential equipment	*For 200 diners*	*For 500 diners*
Compound for sterilizing dishes	1 pkg.	2 pkgs
Dishcloths, hand towels (cloth or paper)	6 pkgs.	10 pkgs
Soap for handwashing	6 lg. cakes	10 lg. cakes
Scouring powder	2 cans	4 cans
Soap or detergent products (for dishes)	2 pkgs.	4 pkgs.
Floor and other cleaning cloths	2	4
Broom	1	2

MISCELLANEOUS EQUIPMENT

Essential equipment	*For 200 diners*	*For 500 diners*
Knife sharpener	1	1
Pot holders	8	8
Matches	1 carton	1 carton
Desirable to extent available		
Hammer	1	1
Shears	1	1
Fuel can with screw-top filler	As needed	
Camp stools	3	4
Wooden boxes for packing small equipment	As needed	
Lanterns for night feeding	As needed	

SAFETY EQUIPMENT

Essential equipment	*For 200 diners*	*For 500 diners*
First Aid 16-unit Kit	1	1
Fire extinguisher	1	1

g. *Mobile Canteen*

(1) A mobile canteen is a one-vehicle unit equipped only for transporting and serving already prepared food. A standard truck, miniature bus, station wagon, jeep or automobile usually can be converted for use as a mobile canteen.

(2) The mobile canteen unit provides space for insulated food and water containers, eating utensils, supplies for serving and sanitation, and for folding tables.

(3) Mobile canteens have limited use and may have to be replenished frequently.

(4) Equipment list assumes the following:

(a) Menu of soup or stew, sandwiches, bread, or crackers, and a hot beverage.

(b) The food has been prepared at a central kitchen and will be transported for service elsewhere.

Suggested equipment for an improvised mobile canteen

EQUIPMENT FOR COFFEE

Essential equipment	*For 50 diners*	*For 100 diners*	*For 500 diners*
Covered container without spigot	1 3-gal.	2 5-gal.	1 10-gal.
Desirable to extent available			
Thermal container with spigot	1 3-gal.	1 5-gal.	2 10-gal.

EQUIPMENT FOR 1-DISH MEAL

Essential equipment	*For 50 diners*	*For 100 diners*	*For 500 diners*
Insulated or other food container	1 3-gal.	1 10-gal.	1 10-gal. and 1 5-gal.
Desirable to extent available			
2-burner stove (butane) or Camp range	1	1	2

EQUIPMENT FOR FOOD SERVICE

Essential equipment	*For 50 diners*	*For 100 diners*	*For 500 diners*
Paper cups, plates, bowls, spoons, and napkins		As needed	
Ladle, small	1	2	4
Ladle, large	1	2	4
Pitchers (2-qt.)	1	1	3
Baskets or boxes with covers, for sandwiches, bread, or crackers	2	4	20
Garbage cans	2	2	4
Enamel pail	1	1	2
Can opener	1	1	2
Wax paper (roll) or other covering	1 (small)	1 (small)	1 (large)
Desirable to extent available			
Serving spoon	1	2	4
Folding tables	2	4	
Large folding table (or planks on wooden horses)			2
Folding chairs (for workers)	2	4	6
Trays	2	4	10
Sugar shakers	1	2	4
Salt shakers	1	2	4

EQUIPMENT FOR CLEANING

Essential equipment	*For 50 diners*	*For 100 diners*	*For 500 diners*
Dish cloths	2	2	3
Pot holders	2	4	6
Dishpans	4	4	4
Cleaning cloths		As needed	
Broom	1	1	1
Soap powder or detergent	1 small box	1 small box	2 large boxes
Scouring powder	1	1	2
Paper towels	1 pkg.	1 pkg.	2 pkgs.
Desirable to extent available			
Dish towels	4	4	6
Steel wool	1 pkg.	1 pkg.	2 pkgs.

MISCELLANEOUS EQUIPMENT

Essential equipment	*For 50 diners*	*For 100 diners*	*For 500 diners*
Matches		As needed	
First-aid kit		As needed	
Water tank		As needed	
Household bleach (to purify water)		As needed	
Desirable to extent available			
Hammer		As needed	
Shears		As needed	
String or wire		As needed	
Lanterns for night feeding		As needed	

Serving food from an improvised mobile canteen.

(a) Set up the tailgate of a truck or station wagon as a serving counter or

(b) Arrange the trunk of a standard automobile for "chuck wagon style" service.

(c) Set up folding or other type tables.

(d) Direct the feeding-line, keeping it formed and moving past the servers.

(e) Use paper eating utensils (unless diners bring their own). Paper plates should be large enough to hold a cup of soup, a roll and coffee.

(f) Set up containers for collecting trash, waste and garbage.

Packing and transporting food.

(a) If space in the vehicle is limited, boxes, baskets or other containers can serve a double purpose.
1/ To carry sandwiches or other food items.
2/ As trash containers after the meal is served.

(b) Containers should be thoroughly cleansed and lined with waxed paper before packing food in them.

(c) If containers for carrying hot food are not the insulated type, pack the containers in improvised insulated boxes to retain the heat, or carry stoves with the mobile canteen equipment and reheat food at serving time.

(d) When ready to load the unit put the prepared food and eating utensils on first. Load the tables and other heavy serving gear last so that they will be first to come off the unit at the destination. This will permit the set-up and arrangement of work spaces without a lot of unnecessary lifting and food handling.

h. *Mobile feeding convoy*

(1) A mobile feeding convoy is the most complete self-contained feeding unit. It is comprised of a number of vehicles that are fully equipped to transport the food

supplies, fuel, water and other necessary equipment for preparing and serving simple meals to large numbers of persons.

(2) Each vehicle of the mobile food convoy fleet has a specific use, such as:
   (a) An office and resting place for the convoy staff.
   (b) Storage of food supplies and utensils.
   (c) Water storage.
   (d) Refrigerated storage.
   (e) Fixed transport for stoves, oven, grills and other large cooking equipment.
   (f) A roving canteen that can serve the food prepared in the convoy kitchen.

Outdoor Feeding

a. Outdoor feeding in emergencies.
   (1) Under certain emergency conditions it may be necessary to use outdoor feeding facilities for limited periods of time.
   (2) Following a natural disaster in which no feeding facilities are available, field kitchens, tents and supplies may have to be set up and used for preparing and serving food.
   (3) If additional temporary feeding facilities are needed, outdoor feeding sites may have to be used in areas not endangered by contamination or subject to severe weather or unfavorable climatic conditions.
   (4) Existing sites such as picnic and barbeque areas in forests, parks and playgrounds may be selected and improvised outdoor expedients may have to be constructed from available local materials.

b. Before preparing an improvised outdoor feeding facility consider the following:
   (1) Distance from food supply and population.
   (2) General suitability of the site in relation to sanitation and supply problems.
   (3) Availability of fuel and materials with which to construct equipment.
   (4) Means of protection in case the facility must be used beyond an overnight period.

c. *Construction of equipment*
Construction of kitchens will require certain basic equipment, including:
   (1) Grills, stoves and/or ovens
   (2) Water heaters

   (3) Handwashing devices
   (4) Dishwashing and sterilizing units
   (5) Grease traps and waste disposal pits
   (6) Dry waste disposal (incinerator)

d. *Location of improvised outdoor feeding facilities.*
   (1) Guides for choosing an outdoor site include the following considerations:
      (a) Level, well-drained ground to help eliminate accidents. Should have natural drainage to keep the kitchen area dry. Avoid clay or black muck. Should have an area of no less than 60 by 40 feet, partially shaded.
      (b) Convenient to persons to be fed.
      (c) Accessible to roads, for delivery of supplies and for dining traffic.
      (d) Accessible to drinking water.
      (e) Located in a sanitary area free of excessive shrubbery, trees, and other foliage that harbor insects and rodents and that restrict freedom of movement; broken glass, tin cans, trash and other debris; stones, ruts, tree stumps; stagnant ponds, streams and open or broken sewers.

e. *Layout of site.*
   (1) Plan work areas for efficiency and convenience.
   (2) Arrange following units to achieve direct traffic flow from point of delivery to point of waste disposal:
      (a) Delivery
      (b) Storage for supplies
      (c) Handwashing
      (d) Cooking and baking
      (e) Serving
      (f) Eating
      (g) Dishwashing
      (h) Garbage and trash disposal
      (i) Staff toilet facilities

f. *Arrangement of outdoor equipment.*
   (1) Keep a straight-line flow from entrance through the serving area into the dining area, then to the washing area, and then the exit.
   (2) Arrange the feeding area for cafeteria style service.
   (3) Set up a sanitizing unit at the head of the line for diners to predip eating utensils (if paper supplies are not used).
   (4) Next place griddles or grills so the food may be served directly from the heat.

(5) Place ovens next, with openings facing away from the serving lines.

(6) Plan the serving area so that it leads directly into the dining area.

(7) Place trash cans and utensil washing facilities for diners at the far outer edge of the dining area leading away from it and from the kitchen.

(8) Arrange cooking and other kitchen equipment parallel to the serving line, allowing a 10-foot aisle between and at least 6 feet between open fires.

(9) Place soakage pit at least 25 feet away from cooking area, and on the opposite side away from the dining area.

g. *Emergency method for determining temperature of an improvised oven by oven hand count:*

(1) Open oven door.

(2) Place your hand in the approximate center of the oven.

(3) Start counting as follows, "one thousand and one," "one thousand and two," etc., until you feel a tingling under the fingernails and have to withdraw the hand.

(4) The number you have reached at that point will be the oven count.

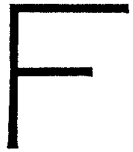
18–20 counts—200° to 225° F.
16–18 counts—250° to 325° F.
12–16 counts—325° to 400° F.
9–12 counts—400° to 450° F.

(Details on the construction and use of various outdoor expedients and on improvising food service equipment are given in Section 4, Pages 133 through 143.)

Other Emergency Methods of Feeding

a. *Food drops* or other emergency distribution methods are used on those occasions when families are marooned or cut off from their normal source of supply because of flood, severe snowstorm, or other disaster conditions. Special food packages are prepared and dropped to isolated families by helicopter or small plane or, if possible, are delivered by boat. In the case of snow-stranded travelers, food is delivered by vehicles capable of going through the drifts to points where motorists, bus or train passengers, and truck drivers are congregated.

GROUND AIR SIGNAL CODE

Meaning	Symbol
Require doctor Serious injuries	
Require medical supplies	
Require fuel and oil	
Require food and water	

Suggested Content of an Emergency Food Package for a Disaster-Isolated Family

Food Item	Total for Family of Four for a One-Week Period
Milk Products (includes nonfat dry milk, evaporated milk and processed cheese)	20 quarts or its equivalent
Meat, Poultry, Fish, Beans Canned "all meat" (includes ham, corned beef, luncheon meat and all meat with gravy). Canned Meat and Poultry combinations (includes stew, goulash, chili, hash, spaghetti, beans and the like). Canned Fish (includes salmon, sardine, mackerel and tuna fish).	20 pounds

Suggested Content of an Emergency Food Package for a Disaster-Isolated Family (Continued)

Food Item	Total for Family of Four for a One-Week Period
Flour, Cereal and Cereal Products (includes ready-to-eat and uncooked cereals; rice, spaghetti, other pasta; crackers, cookies, flour; meal; biscuit, muffin, pancake and other mixes).	12 pounds
Fruits and Vegetables Canned citrus juices (includes orange, grapefruit, tangerine and mixtures). Canned and dried fruits (includes applesauce, peaches, pears, apricots, prunes, pineapple and fruit cocktail). Canned and dried vegetables (includes carrots, greens, corn, beets, peas, beans, tomatoes and dehydrated potato granules).	35 pounds
Fats and Oils (includes butter, margarine; lard, other shortening; oils).	2–3 pounds
Sugars and Sweets (includes sugar, jams, jellies, instant puddings, gelatin desserts).	2–3 pounds
Miscellaneous Staples (includes canned condensed and ready-to-eat soups; coffee, tea, chocolate beverage; dry yeast—if bread is to be home baked).	As desired

Select from among the above suggestions those specific food items that are familiar to and in keeping with the eating customs of the people to be fed.

The food quantities may be adjusted as appropriate to meet needs for shorter or longer periods.

Suggested Pattern Menus for One-Week Period

(Based on the suggested list of contents of food package. To be enclosed with food package.)

	First Day	*Second Day*
Breakfast	Fruit Juice Pancakes – Spread Beverage	Fruit Juice Cereal – Sugar – Milk Muffins – Spread Beverage

Suggested Pattern Menus for One-Week Period (Continued)

(Based on the suggested list of contents of food package. To be enclosed with food package.)

Main Meal	Meat Product Potatoes – Vegetable Hot Bread – Spread Apple Crisp Beverage	Meat Product Potatoes – Vegetables Bread – Spread Pudding Beverage
Lunch or Supper	Beans Bread and Spread Canned fruit Beverage	Soup – Crackers Macaroni and Cheese Apple Sauce Beverage
	Third Day	*Fourth Day*
Breakfast	Stewed dried fruit Cereal – Sugar – Milk Biscuits – Spread Beverage	Tomato Juice Cereal – Sugar – Milk Biscuits – Spread Beverage
Main Meal	Meat Dish Potatoes – Vegetable Biscuits – Spread Beverage	Meat Dish Potatoes – Vegetables Fruit Beverage
Lunch or Supper	Escalloped fish Vegetable Bread – Spread Pudding Beverage	Soup Baked Beans Cookies Beverage
	Fifth Day	*Sixth Day*
Breakfast	Fruit Juice Fried Mush – Syrup Beverage	Stewed Fruit Cooked Cereal Muffins – Spread Beverage
Main Meal	Chili con Carne Crackers Rice – Vegetable Fruit Beverage	Meat – Noodles Vegetable Biscuits and Spread Instant Pudding Beverage
Lunch or Supper	Soup – Crackers Vegetable Pudding Beverage	Melted cheese on toast Vegetable Cookies Beverage
	Seventh Day	
Breakfast	Fruit Juice Cereal – Sugar – Milk Bread – Spread Beverage	

Suggested Pattern Menus for One-Week Period (Continued)

(Based on the suggested list of contents of food package. To be enclosed with food package.)

Main Meal	Soup – Crackers Meat or Fish Vegetable – Potatoes Stewed fruit Beverage	
Lunch or Supper	Cheese Sandwich Spaghetti – Vegetable Pudding Beverage	

b. If an individual or family has no food supplies, but has a means of preparing its own meals, food orders or food shopping cards may be issued on the basis of family need.

c. In some disaster situations, ready-to-eat food or boxed meals may be distributed. Examples:
   (1) When a mass evacuation is undertaken—boxed meals may be prepared at a central kitchen and distributed by persons assigned to accompany the evacuees. Or mobile canteens from local communities along the evacuation route may distribute the meals.
   (2) Forest fire fighters or other disaster workers who must be fed at their posts.

SELECTION OF FOODS AND MENU PLANNING

Foods to Serve in Disaster

1. The period after a disaster is not the time to try to persuade victims to accept and eat unfamiliar foods. Every effort should be made to provide foods in forms that are familiar and acceptable to the group to be fed and that can be prepared without difficulty by the cooks.

2. The following are examples of basic foods that are generally familiar and acceptable to most groups:

a. Soups
   Chicken broth with rice or noodles, plain vegetable, bean, lentil, split pea and tomato.

b. Meat and meat alternates
   Beef in all forms, lamb, poultry, fish, eggs, dried beans, peas and lentils.

c. Vegetables
   Baked and boiled potatoes, green peas, string beans, tomatoes, lettuce, celery and varieties of raw and cooked greens.

d. Fruits
   Most fruits—fresh, cooked or dried.

e. Cereals
   Plain cooked rice, spaghetti, noodles, macaroni, wheat cereals, breads, crackers, cookies and cakes.

f. Milk and milk products
   Milk for children, cheese, cottage cheese and ice cream.

g. Beverages
   Coffee and tea.

Planning Disaster Meals and Menus

1. Those who plan meals in a disaster situation should consider the following factors:

a. Simplicity
   Disaster meals should be simple even though facilities and equipment for elaborate meals may be available.

b. Nutritional needs
   While menus should be planned to meet as fully as possible the nutritional needs of a group, it may not be feasible to do so in a disaster emergency, when the supply of foods may be limited. Whenever possible, disaster meals should include foods from each of the four food groups that are the basis of an adequate diet: milk, meat, vegetable and fruit, and bread and cereal groups. Other foods such as butter, margarine, fats and oils, sugars, flavorings and seasonings, are used to round out the meals, to give taste appeal and to satisfy the appetite.

c. Other factors
   Planning disaster meals starts with making the menus, but factors other than nutritional needs must be considered if the menus are to be workable in relation to the facilities and suitable to the groups to be fed. It is especially important to keep the following questions and menu-planning factors in mind:
   (1) Type and size of group to be served.
      How many men, women and children are in the group? How many aged or chronically ill? Do they have special food requirements? Special food customs, restrictions or preferences? What kind of work are they performing?
   (2) The kitchen layout, work space, and available utilities and equipment. Does the menu conform to the limitations of space, the food service equipment and facilities and water and fuel supplies?
   (3) Means of food distribution
      Is the menu related to the means of distribution, the

serving equipment available, and the distance over which the food will be transported?

(4) Food supplies
Are food supplies readily available? Are they in season? Can you count on a variety? Will delivery be a problem? Will storage facilities be available? Will you have refrigeration? Will foods be donated? Will surplus commodities be available?

(5) Season of the year and weather conditions
Is the menu practical in terms of the season and weather?

(6) Personnel
How many will be available to do the work? Who are they? How experienced are they? Has the staff the skills to carry out the menu easily? Are the processes long and complicated for available staff?

(7) Time
How much time will be needed to prepare and serve the meal?

(8) Budget
Do the menus exceed the budget?

(9) Familiar and acceptable foods
Are the menus designed to include foods that are generally familiar to the cooks and accepted and liked by most groups?

2. *Food for the early emergency period*

a. The period of impact following a disaster is a period of stress and anxiety. The object of feeding during this stage is mainly psychological.

b. In natural disasters, mobile feeding facilities are often speedily dispatched to the scene in order to provide on-the-spot refreshment to victims and workers.

(1) Food served during the immediate emergency may be very simple—food that is planned to allay hunger and sustain morale. A stimulating beverage and a light snack does much to comfort disaster victims and to help them recover and begin to help themselves.

(2) Beverage may be:
(a) Coffee, cocoa, milk, fruit juice or soft drink.
(b) Consider weather conditions in the choice of beverage.
(c) Avoid iced or hot beverages for persons in shock.
(d) Provide milk for infants and children. It will help to relieve parental anxiety about the welfare of their children.

(3) Simple snacks may be:
Light sandwiches, cookies, crackers, hard candies or other easy-to-serve items. Choose sweet and starch foods that provide quick energy to help overcome fatigue. Choose foods that are easy to hold in the hand while eating.

3. *Food for the intermediate period*

a. After the immediate emergency, meal service may have to be an around-the-clock operation. Until full cooking facilities are established a simple but nourishing one-dish hot meal that is easy to prepare and transport and to serve should be provided.

b. If, at first, there is no means of heating the meals, feeding teams may have to use packaged, canned or fresh foods that can be served without heating. These may include: canned meats, milk, fish, stews, beans, spaghetti, soups, vegetables, fruits and juices. Ready-to-eat packaged cereals, breads, crackers, cookies, cheese, peanut butter, jams and other spreads.

4. *Food for extended operations*

a. As soon as means of heating, cooking and serving food are available, serve hot soups, a hearty main dish such as stew or other one-dish meal, with bread, fruit and beverages.

b. When feeding facilities are in full operation, follow a normal pattern of two or three meals a day.

FEEDING SUGGESTIONS for ASSUMED EMERGENCY SITUATIONS

Early Emergency Situations

Several possible emergency situations are given, with suggestions for food service under the conditions assumed. The foods selected are those that require little or no cooking and can be easily distributed and served if facilities are limited or lacking.

Situation 1.

a. Assume—
(1) No safe water.
(2) No refrigeration.
(3) No cooking or serving facilities.

b. What to do—
(1) Rely on canned and packaged foods eaten cold, directly from the container. Save tin cans for possible future use as eating utensils.

(2) Use juice from canned fruits and vegetables as substitutes for water.
(3) Serve foods only in containers that can be held in the hand.

c. Food suggestions—
(1) Canned soups, fruit and vegetable juices
(2) Canned meats and fish, beans, spaghetti
(3) Canned fruits and vegetables, dried fruits
(4) Evaporated milk, cheese
(5) Ready-to-eat packaged cereals, to eat out of the package
(6) Crackers, packaged cookies, tinned breads
(7) Individual-pack jams and jellies
(8) Instant chocolate or chocolate syrup, combined with evaporated milk
(9) Peanut butter, table fat, edible oils

Situation 2.

a. Assume—
(1) Safe water.
(2) Some kind of improvised or existing cooking facilities.
(3) Some safe receptacles for food and drink (tin cans or paper serving supplies).

b. What to do—
(1) Serve a simple one dish meal such as hot soup, stew, bread or crackers, and a hot drink.
(2) If water for cooking is rationed, use vegetable juices and canned soups as liquid for cooking.
(3) Use water ration for coffee and tea.

c. Simple menu suggestions—

Menu A
(a) Canned juice
(b) Thick hot vegetable soup
(c) Crackers
(d) Coffee with evaporated milk, sugar

Menu B
(a) Thick bean soup
(b) Crackers (cornbread or emergency biscuits if ovens available)
(c) Dried fruit
(d) Hot beverage

Situation 3.

a. Assume—

(1) Some water.
(2) No utilities.
(3) Central kitchens with cooking facilities converted to LP gas.
(4) Mobile canteens available.

b. What to do—
(1) Prepare food in the central kitchen.
(2) Establish mobile feeding operations with line feeding.
(3) Serve one dish meal, bread or sandwiches with fillings not subject to quick spoilage, and an easily handled beverage.

c. Suggested menu patterns—

Menu A
(a) Canned juice
(b) Packaged, ready-to-eat cereals
(c) Milk
(d) Bread with spread
(e) Hot beverage

Menu B
(a) Soup, canned or fresh
(b) Bread and spread
(c) Beverage
(d) Cookies

Menu C
(a) Sandwiches
(b) Fruit, dried, fresh or canned
(c) Hot beverage

Two Meals a Day after the Early Period

During the early period when labor, equipment, and food supplies are limited, provide two meals a day until feeding facilities can be fully established. Following is a suggested pattern for the two-meal a day plan:

a. Assume—
(1) Eating utensils available.
(2) No utilities. (LP gas available.)
(3) Buildings safe for feeding.
(4) Existing food establishment converted for emergency feeding.

b. What to do—
(1) Serve two simple meals a day.
(2) Use line feeding service.

c. Suggested menu patterns—

First meal

(a) Fruit juice
(b) Packaged ready-to-eat cereal
(c) Bread and spread
(d) Hot beverage with sugar and evaporated milk

Second meal

(a) Hearty soup, stew, or other main dish such as: Bean or vegetable soup; potato and corn chowder; meat and vegetable stew; macaroni with meat or cheese; rice and tomatoes; baked beans; hard-cooked eggs
(b) Crackers or bread
(c) Fresh fruit, eaten out of hand
(d) Cookies

Three Meals a Day During Extended Feeding Operations

As soon as facilities and supplies permit, three evenly spaced meals should be provided.

a. Assume—
   (1) Building safe.
   (2) Utilities available.
   (3) Central kitchen facilities available.
   (4) Shelter established.

b. What to do—
   (1) Establish line feeding. Serve 2 or 3 meals, as circumstances permit. Meals may be as normal as supplies permit.
   (2) Suggested menu patterns—
      (a) First meal
      Fruit or juice; cooked or ready-to-eat cereal; milk, as available; bread and spread; beverage
      (b) Main meal to include:
      A main dish, either meat, fish, cheese, egg or beans
      Serving of either potatoes, rice, macaroni or spaghetti
      A vegetable—raw, canned or dried
      Bread and spread
      A dessert, if available
      (c) Third meal
      A simple snack of soup, sandwiches and beverage, or fruit

Menu Suggestions for Disaster Lunches or Suppers

Tomato Soup with Rice
Bread and Spread*
Stewed Dried Apricots
Tea – Milk

Sliced Cheese Sandwich
Apple Sauce
Tea – Milk

Lentil Soup
Bread and Spread
Canned Purple Plums
Tea – Milk

Sliced Luncheon Meat
Hot Potato Salad – Vinegar Dressing
Bread and Butter or Spread
Cookies
Tea – Milk

Split Pea Soup
Bread and Spread
Whole Orange
Tea – Milk

Vegetable Soup
Peanut Butter Sandwich with
Jam or Jelly
Banana
Tea – Milk

Navy Bean Soup
Bread and Spread
Raw Apple
Tea – Milk

* Spread may consist of butter or margarine, or jam or jelly, or other available product.

Menu Suggestions for Disaster Main Meals

Frankfurters
Baked Beans (canned)
Bread – Butter or Margarine
Peaches (canned)
Milk – Coffee – Tea

Spaghetti with Meat Sauce
Peas (canned)
Bread – Butter or Margarine
Pears (canned)
Milk – Coffee – Tea

Canned Corned Beef Hash with Catsup
Green Lima Beans (canned)
Bread – Butter or Margarine
Raw Apple
Milk – Coffee – Tea

Sliced American Cheese
Elbow Macaroni – Tomato Sauce
Diced Carrots (canned)
Bread – Butter or Margarine
Apricots (canned)
Milk – Coffee – Tea

Hard Cooked Eggs on Spanish Rice
String Beans (canned)
Bread – Butter or Margarine
Purple Plums (canned)
Milk – Coffee – Tea

Meat Balls or Meat Loaf
Sliced Beets (canned)
Bread – Butter or Margarine
Apple Sauce (canned)
Milk – Coffee – Tea

Meat Stew with Vegetables
Bread – Butter or Margarine
Fruit Cup (canned)
Milk – Coffee – Tea

EMERGENCY FEEDING FOR SPECIAL GROUPS

It may not be possible for feeding teams to provide the formulas and modified diets required by:

a. Infants
b. Nursing and expectant mothers
c. The chronically ill
d. The aged and infirm
e. The unhospitalized sick and injured

However, until diets can be modified for these groups, they may, with the exception of infants, be fed regular foods that have been liquefied, softened or otherwise modified to meet the particular requirements.

Disaster workers will not need modified diets but they will require generous servings of high-energy foods to enable them to carry on their duties with a minimum of exhaustion.

The greatest food urgency in an emergency is the feeding of infants. In most instances, adults can exist for several days without food and for lesser periods without water and not suffer physical harm. However, the prompt provision of suitable food and liquid for infants up to 1 year of age is a necessity. Disaster planning for the feeding of special groups, therefore, should give priority to infants and expectant and nursing mothers.

Infant Feeding

1. *Special needs*

a. In an emergency mass feeding situation special consideration for babies should be given to priority of supplies and sanitary precautions.

b. The hazards from contaminated water and milk are greatly increased under disaster conditions. Bacterial contamination can result from pollution of the public water supply, lack of facilities for sterilization, sanitization and refrigeration and improper preparation of formula and food by inexperienced personnel.

2. *Guides to feeding of infants in mass care shelters*

a. The increased potential for illness and the spread of communicable disease in a mass care shelter is especially hazardous for infants. Under normal conditions the feeding of a baby is planned with the guidance of the physician to meet its own individual needs. Under natural disaster conditions in mass care shelters such individualized infant feeding is usually neither practical nor safe. In such an emergency situation when there are many infants to feed, a simple,

standardized formula may have to be provided for the entire infant population of a shelter until such time as individualized feeding can be considered safe and practicable. For these reasons the feeding of infants in mass shelters is a highly specialized operation that must be regularly and separately staffed under the supervision of a physician or a nurse. Feeding personnel may be assigned to assist medical and para-medical staff in the discharge of their responsibilities for preparing and distributing formulas and supplementary foods for infants. Therefore food workers should be informed on the problems and responsibilities of this operation as well as on the approved emergency methods and techniques of feeding infants in mass care shelters.

b. A central area of supply and distribution for infant feeding should be established in the mass care shelter. This area should be:
   (1) A room or screened-off section that is separated from living and sleeping areas, lavoratory facilities, and the ill and injured.
   (2) Adequate in size to provide for clean working space, proper storage of formula ingredients and supplies, safe water and all necessary equipment.
   (3) Staffed on a regular basis and adequately supervised to be sure that each mother receives a sterile, fresh formula for each baby at every feeding.

c. *Commercially prepared formulas:*
   (1) The formula of choice for greatest safety is one that is commercially prepared, pre-sterilized and requires no refrigeration as long as containers remain unopened. This type of formula is commercially available in most communities in a variety of containers.
   (2) The preferred type is ready-to-use, requires no addition of water and is packaged in individual disposable feeding containers with a sterile disposable nipple for each.
   (3) Nursing responsibilities in distribution of this type of formula include:
   Instruction for mothers in the proper use and handling of the feeding containers; development of a control system to insure actual disposal of the used containers and nipples (after the first issue, each subsequent formula might be issued upon receipt of a used container); helping mothers who normally use clean, but not sterile technique in home preparation of formulas, to understand reasons for these precautions in a shelter situation.

(4) When commercially prepared formula is not available in the disposable feeding containers described here, it is still preferred in whatever form available over actual preparation of formula. In this case the proper sterilization of bottles and nipples and the transfer of formula from commercial containers to sterile bottles should be done in the shelter formula center under supervision. Distribution can then be similar to that used for disposable containers.

d. *Shelter-prepared formulas*

(1) In natural disaster situations when formula must be prepared in a shelter the work should only be done under the direction of the shelter nurse, or other qualified person such as a physician, dietitian, practical nurse or nurse's aide.

(2) The following are general guides to preparation and handling:

With adequate refrigeration a 24-hour supply may be prepared. Any left over after the 24-hour period should be discarded.

Without refrigeration, no formula should be prepared more than 2 hours prior to feeding.

For reasons of safety, terminal sterilization is the method of choice for all emergency prepared formula.

Where possible use plastic bottles all of the same brand or type, so that nipples, rings and others parts are interchangeable.

e. *Emergency milk formula recipes*

The following recipes for emergency milk formulas are given as a guide for food workers.

The concentrated formulas in chart 1 are usually suitable for older babies, while the less concentrated formulas in chart 2 are for younger babies.

Chart 1 Emergency Milk Formulas

(Concentrated—20+ calories per ounce)

Formula Recipe	Ingredients	Amount		Amount	
a.	*Whole Milk Sugar *or* optional Corn Syrup	1 quart (32 oz.) 2 tbsp. (1 oz.) *or* 2 tbsp. (1 oz.)	approx. yield 32 ounces	19 quarts 1 lb. *or* 1 pint	approx. yield 600 ounces

(Continued)

Chart 1 Emergency Milk Formulas (Continued)

(Concentrated—20+ calories per ounce)

Formula Recipe	Ingredients	Amount		Amount	
b.	Evaporated Milk Water (to liquefy) Sugar *or* Corn Syrup	1 tall can (13 fl. oz.) 1 tall can (13 fl. oz.) 2 tbsp. (1 oz.) *or* 2 tbsp. (1 oz.)	approx. yield 26 ounces	23 tall cans 9 quarts 1 lb. *or* 1 pint	approx. yield 600 ounces

Chart 2 Emergency Milk Formulas

(Less concentrated—16+ calories per ounce)

Formula Recipe	Ingredients	Amount		Amount	
c.	*Whole Milk Water Sugar *or* Corn Syrup	1 quart (32 oz.) 1 pint (16 oz.) 2 tbsp. (1 oz.) *or* 2 tbsp. (1 oz.)	approx. yield 48 ounces	13 quarts 7 quarts 1 lb. *or* 1 pint	approx. yield 650 ounces
d.	Evaporated Milk Water Sugar *or* Corn Syrup	1 tall can (13 fl. oz.) 2 tall cans (26 fl. oz.) 2 tbsp. (1 oz.) *or* 2 tbsp. (1 oz.)	approx. yield 39 ounces	16 tall cans 12 qts. 1 lb. *or* 1 pint	approx. yield 600 ounces

* Whole milk may be fresh fluid or may be reconstituted from dried whole milk according to directions on the metal container. Dried milk preparations in non-metal containers are of the nonfat variety and may be used in an emergency, but will not provide sufficient vitamin A or adequate calories for an extended period.

f. *Making infant formulas*

(1) Requirements:

Clean working space; stove or hot plate for boiling water; formula ingredients.

(2) Equipment needs:

Pitcher, jar or bottle (1 quart); measure (1 quart); measuring cup marked in ounces (if available); knife or spatula; long-handled spoon; funnel (may be improvised with heavy wax paper or foil); measuring spoon; can opener; bottle brush; towel; pot holders; tongs for handling bottles; nipples; nipple caps (metal, plastic, glass or paper); nipple jar; kettle or other deep cooking utensil (9 inches high) with tight fitting cover and rack for sterilizing bottles; pan for washing bottles and utensils, detergent.

(3) Improvised equipment

Vinegar or soft drink bottles (6-ounce).

(Wide nipples will fit over standard 4½-ounce glass baby food jars); 5-quart oil or other large cans for sterilizers (oil cans may be obtained from a service station and must be thoroughly cleansed before use). *(WARNING: Never under any circumstances use cans or drums in which insecticides, paints or chemicals were stored.)*

Towels or lids of the cans to use as racks; pie pans or inverted kettles for cover; string, wrapping paper, absorbent cotton or gauze to make nipple caps.

(4) Ingredients:

Evaporated or fresh, pasteurized milk.

Cane sugar or syrup.

(5) Directions for making formulas (improvised sterilized technique):

Wash and thoroughly rinse all utensils. Use bottle brush to scrub bottles and nipples in hot, soapy water. Rinse in hot, clear water; squeeze water through nipple holes and let drain. *Do not wipe.*

Assemble formula ingredients.

If evaporated milk is used, wash top of can with soap and water and rinse with hot water before opening.

Measure required amounts of each ingredient into saucepan, pitcher or other container.

Stir or beat until thoroughly mixed and dissolved.

Pour required amounts into bottles.

Place nipples on bottles. Cover with metal, plastic or glass nipple caps (do not tighten caps), or by other covering such as clean brown wrapping paper, waxed paper, absorbent cotton or gauze.

Place a rack or towel in the bottom of the kettle or other sterilizing container. If a large can is used, the top may be made into a rack by cutting inch-wide sections at four places evenly spaced around the edge and turning them under. A pie tin or inverted kettle that fits properly may be used as a lid.

Place bottles on rack in the container for sterilization. Arrange to prevent tipping or spilling.

Put 2 or 3 inches of cold water in the bottom of the container until water is halfway up the bottles. Cover. Bring the water to a boil. When it starts to boil, note the time. Simmer gently for 25 minutes. Time *accurately.*

After the water has simmered for 25 minutes, set the container off the stove. Leave the lid on. Do not remove until cool to the touch.

Remove bottles, tighten the nipple caps (if glass, plastic or metal), label and refrigerate. If refrigeration is inadequate, suitable facilities must be improvised or the formula must be used immediately after preparation.

g. *Warming formula milk*

The usual practice of warming formula to body temperature before feeding the infant may not be possible in an emergency. Safe, unwarmed formula will not harm an infant in most cases.

h. *Water for infants*

Well babies who are taking normal amounts of breast milk or formula are usually receiving adequate fluid intake, and do not need additional water. A small supply of boiled water in sterile feeding bottles should be prepared each day for babies whose conditions indicate such need, or for whom the physician may order extra water.

i. *Solid foods*

Many babies of all ages are accustomed to the inclusion in their diets of cereal, strained fruits and the like, and may manifest hunger if these are missing. While the confusion of shelter living may not be conducive to the successful introduction of *new* foods, it is important to provide prepared baby foods as soon as possible for babies whose diets have previously included these.

j. *Sensitivity or allergy to cow's milk*

In some instances, a mother may indicate that her physician has prescribed a special formula because her baby is sensitive or allergic to cow's milk. If the mother does not have a supply of the prescribed formula with her, the shelter nurse should learn from her the exact name of the preparation, obtain it through medical and nursing emergency supply channels, and prepare it for feeding according to directions. Until it can be obtained and prepared, the baby should be given only boiled water with sugar or syrup added.

k. *Fresh milk equivalent*

1. One tall can (14½ oz.) contains 13 fluid ounces of *evaporated milk,* the nutrient equivalent of slightly less than 1 quart of fresh, fluid, whole milk. A daily allowance of 1 tall can per child under 2 years of age will meet nutritional requirements.
2. When safe water for liquefying is available, *nonfat dry milk* (dry skim milk) is satisfactory for emergency infant for-

mulas for a short period of time. Four and one-half ounces (4½ oz.) of dry skim milk is equal to the solids in a quart of fresh skim milk.

l. *Sugar for energy*

1. Sugar or corn syrup is commonly added to infant formulas (of dilute whole milk) as an extra source of energy.
2. If sugar or corn syrup is not available, an equal quantity of a more concentrated milk mixture may be substituted, provided the milk (if fresh, whole milk) is modified by heating so that a finely divided curd is formed in the stomach.

m. *Daily food requirements for infants under 2 years*

1. Period of, or immediately following disaster:

Item	*Quantity per Infant per day*
Water	1 quart
Milk, evaporated	1 tall can (14½ ounces)
Sugar	1 ounce
Crackers, soda	1 ounce
Cereal (wheat or rolled oats)	1 ounce

2. Period following disaster and before complete return to normalcy:

Item	*Quantity per Infant per day*
Water	1 quart
Milk, evaporated	1 tall can (14½ ounces)
Sugar	1 ounce
Cereal	½ ounce
Sieved meat or meat soup	1–3½ ounce can
Stewed meat or vegetable	1–4½ ounce can
Orange juice or other source of Vitamin C as prescribed by a physician.	

Nursing and Expectant Mothers

1. Nursing mothers should be encouraged to continue breast feeding and should receive their own allotment of milk as well as other fluids in adequate amounts. One quart of fresh whole or skim milk, or its equivalent in evaporated or dried milk, plus the full food allowances for other adults is recommended for nursing mothers.
2. Expectant mothers should receive priority in milk rations after nursing mothers, and their diets should be supplemented as much as possible through larger servings of foods high in calorie and protein, such as cereals, bread, dried beans and peas and cheese. If supplies are adequate, the same quantity of fresh whole or skim milk, or milk equivalent, is recommended for expectant mothers.

Recommended Milk Ration in Emergency

Groups (in order of priority)	Where supplies are extremely limited per person per day	Where supplies are moderately limited per person per day
	Can	Can
Infants under 1 year*	1–(7½ oz. can)	1–(7½ oz. can)
Children 1 to just under 2 years	1–(14½ oz. can)	1–(14½ oz. can)
Sick children 2 to 9 years	1–(14½ oz. can)	1–(14½ oz. can)
Women in last half of pregnancy	1–(14½ oz. can)	1–(14½ oz. can)
Women in first half of pregnancy	None	1–(14½ oz. can)
Well children 2 to 9 years	1–(7½ oz. can)	1–(14½ oz. can)
Sick persons over 10 years	1–(7½ oz. can)	1–(7½ oz. can)
Well children 10 to 14 years	None	1–(7½ oz. can)
Well children 15 to 19 years	Note	1–(7½ oz. can)

* Mothers of breast-fed infants should receive the infant's ration of milk.

The Chronically Ill

1. Feeding of the chronically ill is also a specialized procedure, but feeding teams may be faced with furnishing food to chronically ill persons who are not hospitalized and are not under immediate medical care.
2. In general, chronically ill persons can subsist temporarily on medications they may have with them supplemented by food supplied by a feeding team without undue injury. For example:
   a. Ambulatory tuberculosis patients.
   b. Persons with peptic ulcers who know their own dietary restrictions.
   c. Diabetics with their own insulin supplies. These persons must avoid concentrated sweets and limit the intake of starches and fats.
3. Injured diabetics are strictly a medical problem.

The Aged and Infirm

1. The problem with this group is providing foods that are nutritious and that can be easily chewed and digested, such as cereals, soups, eggs, soft-filling sandwiches and sieved meats, fruits and vegetables.
2. Foods should be served in easy-to-handle form, particularly foods for those with arthritis, palsy or other infirmities.

3. Those in this group having sore mouths or chewing and swallowing difficulties should be given liquid or sieved foods, such as the commercially prepared infant foods.

The Sick and Injured

1. As in the case of the chronically ill, the feeding of sick and injured persons is a specialized procedure.
2. An ambulatory person with minor illness or injury who is enroute to medical treatment may be given the regular food or foods that have been liquefied, mashed or softened for ease of eating if this is necessary.
3. Ambulatory persons, recognized as being in shock, should be given only a warm sweet drink and a snack and then placed under medical care.

High Protein Feeding

Feeding teams may be asked by physicians to prepare high protein feedings for ill and injured patients.

Following are directions for the proper preparation of these feedings (these recipes supply approximately the same amount of protein per ounce of feeding or about 150 grams (5 ounces) per quart):

Recipe No. 1

3 cups non-fat dry milk (dry skim milk)
3 cups fresh whole milk

Recipe No. 2

3¼ cups non-fat dry milk (dry skim milk)
1 (14½ ounces) can evaporated milk
14½ ounces water

(For patients who may dislike the taste of milk, flavorings such as vanilla, cocoa or coffee sirup may be added.)

Procedure

(a) Measure the liquid milk into a bowl or glass jar.
(b) Measure the dry milk powder and sprinkle over the liquid milk.
(c) Stir with a spoon or fork, or shake in the covered glass jar. (A rotary egg beater or wire whip is generally used but may not be available in a disaster.)
(d) Allow foam to settle.
(e) Refrigerate.

Salt and Soda Solution

a. Salt and soda solution is not a preparation for mass feeding, but emergency feeding teams may be asked by physicians to prepare the solution for their patients, such as those with severe burns. Although the solution is simple to make, proportions must be correct. A recipe for the solution follows:

b.

	Recipe For 1 Quart	*For 24 Quarts*
Stir:	1 teaspoon salt and	½ cup salt and
	½ teaspoon baking soda into	¼ cup baking soda into
	1 quart of water	6 gallons of water

NONFAT DRY MILK (DRY SKIM MILK)

Nature and Use

1. Dry skim milk is produced by removing the fat and water from fresh whole sweet milk. The powder form retains the B-vitamins and all of the bone-and muscle-building nourishment of the fresh milk. It loses Vitamin A through removal of the fat.
2. Dry skim milk is convenient to store and easy to use. It can be mixed quickly with water to make fluid skim milk, and can be used in any recipe that requires milk.
3. In most recipes that call for a large quantity of dry ingredients, the skim milk powder may be used from the container without reconstitution. Use 3 tablespoons of milk powder for each cup of fluid milk that the recipe calls for. Mix the dry milk powder with the other dry ingredients, then follow recipe using water instead of fluid milk.
4. Store milk powder in a cool, dry place in a tightly covered container. When exposed to air the powder becomes lumpy and changes flavor.
5. Fluid milk made from milk powder and water must be kept cool and clean and covered the same as fresh fluid milk.
6. Proportions of dry skim milk to water to form fluid skim milk are as follows:

Skim milk powder +	Water =	Approximate yield in fluid skim milk
3 tbsp.	1 cup	1 cup
¾ cup	1 qt.	1 qt.
1 lb.	5 qt.	5 qt.

Directions for Reconstituting Spray-Dried Skim Milk Powder

1. Water should be at moderate temperature.
2. Pour water into a mixing bowl, or a jar or shaker with

tight-fitting cover, large enough so water about half-fills the container.

3. Sprinkle dry skim milk on top of water.
4. Whip with a rotary beater, whisk, spoon or fork—or shake closed container—until the powder is dissolved. Lukewarm water will speed the mixing. When mixed, keep cold same as fresh milk.
5. Never add dry milk powder directly to a boiling mixture.

Instant Dry Milk Powder

1. Instant dry milk powders need no beating or shaking to mix. They dissolve readily in either hot or cold water by simply stirring with a spoon.

SAFE FOOD AND WATER

PUBLIC HEALTH SIGNIFICANCE OF FOOD AND WATER

1. The importance of food and water as essentials to life cannot be overemphasized.
2. Disease organisms can be transmitted through water and food supplies, causing epidemics of water- and food-borne diseases.

IMPORTANCE OF SANITATION IN DISASTER FEEDING OPERATIONS

1. The objective of sanitation is to prevent disease and promote health through control of such environmental factors as food, water and air.
2. Sanitation is a continuing element in our everyday life. The importance of sanitation is greatly increased in both natural and enemy-caused disaster, as is the probability of food and water-borne disease.
3. In enemy-caused disasters, contamination by radioactive particles is an additional hazard. Safeguards against this hazard are properly considered a sanitation measure.
4. Enforcement of sanitation standards on the part of the public and the people preparing and serving food is required.

SANITATION RESPONSIBILITY

1. The overall responsibility for the maintenance of sanitation in a disaster area is that of the health officials. A sanitation program usually includes:
   a. General surveillance and sanitation inspection of disaster areas, to recommend and require observance of public health and sanitation measures.
   b. Technical assistance for the protection of food, water and air. Such services include:

(1) Selecting and approving water supply sources.
(2) Detecting contamination by means of inspections and laboratory examinations.
(3) Advising on decontamination measures where radioactive fallout or other contaminating agents caused by floods or explosions have affected water and food supplies.
(4) Recommending methods of sanitary disposal of refuse and waste products.

2. Sanitation is also the responsibility of every person who prepares and dispenses food to others, especially to the public. The cook, the server, the dishwasher, and all other persons who handle food and food utensils have a serious responsibility and must maintain the sanitation of the food establishment for the protection of themselves and those they feed.

WATER

Safety of Water

1. In cases of disaster, it should be assumed that all untreated water is unsafe for human consumption. Surface water is exposed to drainage and to human and animal wastes. As a result, surface water usually requires more treatment than ground water. However, both ground and surface water may contain organisms that are dangerous to health, so all water supplies must be treated before consumption.
2. Sanitary engineers or sanitarians will give advice regarding approved water sources and will recommend specific methods of water purification or disinfection.
3. If a health official is not available, the following information may be helpful in providing and assuring a safe water supply for a feeding center:

a. *Sources of water supply*
Water supplies are usually obtained from: *Ground water* (from wells or springs); or *Surface water* (from rivers, lakes, and ponds).

b. *Choosing a source*
(1) Use water from an approved* public water supply system to the fullest extent.
(2) As the next choice, use water from existing springs or wells.
(3) If public or ground water supply sources are not available, use water from surface sources such as rivers, streams, lakes or ponds.

* Approved by the health agency having jurisdiction in the area involved.

c. *Choosing a ground water source.*
(1) Wells and springs should be located at safe distances (100 feet or more) from sources of contamination such as latrines, septic tanks, cesspools, and sewers. In limestone ground formations, the distance may need to be much greater.
(2) Wells and springs should be constructed to exclude surface water and high ground water infiltration.
(3) Well and spring sites should not be subject to flooding.

d. *Choosing a surface water source*
(1) Take water at a point well above or at the maximum possible distance from sewer outlets.
(2) Choose a point where the water is clearest. Clear water will be more acceptable. *Clearness of water, however, is not a guarantee of safety.*
(3) Choose a location where natural drainage from toilets or other pollution sources will not contaminate the water.
(4) Avoid locations where currents or countercurrents will introduce surface drainage, oil, or chemical wastes.

Disinfecting Water

A necessary health safeguard is disinfection of all water before use for drinking or cooking.

Turbid or colored water should be filtered through clean cloths or allowed to settle, the clear water then being drawn off before disinfection.

In emergencies, any of the following methods may be used:

a. *Methods for small quantities of water.*
(1) Boiling
Most water can be made safe for drinking purposes by *boiling* for 1 to 5 minutes. Allow to cool. Add pinch of salt to remove flat taste. If boiled water is to be stored, it should be chlorinated.
(2) Iodization
Use 3 drops tincture of *iodine* to one quart of clear water: double if the water is cloudy. Mix and allow to stand for about one-half hour.

b. *Methods for large or small quantities of water.*
(1) Chlorination
(a) Water that is to be used for drinking should be disinfected. Normally, a compound containing chlorine is used. As the compound dissolves in

water, it releases free chlorine which kills bacteria and other organisms. It does not, however, remove anything from the water. As the chlorine kills bacteria it becomes used up itself. Hence, the taste and smell of chlorine in treated water is a sign that the water is safe. Actually it is not safe to use chlorinated water unless you can detect chlorine in it. The chlorine may have become weak through age or for other reasons.

Table of Chlorine Solution for Disinfecting Water

Quantity of water	*Dosage of 5.25% solution**	
	Clear water	*Cloudy water*
1 quart	2-3 drops	5 drops
1 gallon	10 drops	20 drops
5 gallons	½ teaspoon	1 teaspoon
1,500 gallons	1 quart	2 quarts

* Dosages will have to be adjusted for other chlorine strengths and other volumes of water.

(b) Chlorination procedure

(1) Chlorine in the form of sodium hypochlorite works very well.

(2) Ordinary household bleaches contain this compound. 5¼% strength is best. Strengths are given on the jug labels.

(3) Add 10 drops of 5¼% liquid household bleaching solution to 1 gallon of water.

(4) Mix thoroughly by shaking or stirring.

(5) Wait about ½ hour before using the water.

(6) Treated water should have a distinct smell of chlorine. The taste may not be pleasant but the chlorine will not be harmful. If treated water does not have the smell and taste of chlorine, add more bleach, mix further and let stand for another 15 minutes.

(7) Use proportions as shown in the table above.

(2) Purification tablets

(a) Water purification tablets are sold commercially under various trade names. They are generally available at drug and sporting goods stores.

(b) Follow the directions on the bottle label.

(c) Purification tablets release chlorine or iodine when dissolved in water.

(d) Usually one tablet per quart of water is sufficient. Double the dosage, however, if the water is cloudy.

(e) Let the water stand for about ½ hour after the tablet has dissolved.

(3) *Other methods* of disinfection may be recommended by the proper authorities if conditions arise. In such cases follow the instructions of your local government health officials. Unless approved by health officials, do not use any chemical except iodine, chlorine, or water purification tablets to disinfect water.

Storing Water

1. Purified water should be protected against recontamination by proper storage in a covered tank or container.
2. Storage containers for purified water should be cleaned and disinfected before initial use. This can be done by washing inside walls and bottom with detergent, rinsing with clear water, and then rinsing with a strong chlorine solution. (Use 1½ teaspoonfuls of regular household bleach to 1 gallon of water for the disinfecting solution.)

a. Small container.—Store water in any of the following containers only after they have been thoroughly cleansed and sanitized to remove all foreign matter.

(1) Salvaged metal containers.

(2) Salvaged watertight barrels.

(3) Salvaged bathtubs.

(4) Other containers such as wash tubs, sinks, and clean trash cans.

(5) Sealed milk cartons and bottles, other beverage bottles, glass or plastic jugs, ceramic or earthenware pots and containers.

b. Large containers.

(1) Concrete swimming pools.

(2) Tarpaulin-lined pits.

(3) Railroad water tanks not in use.

(4) Industrial water tanks and boilers not in use.

c. Storage and use.

If possible, seal all containers in which disinfected water is stored. If not possible, cover container securely to protect against contamination. Store off the ground. Locate away from garbage and toilet areas. Provide single-use disposable drinking cups. *Never use a common drinking cup.*

Transporting Water

1. Water sprinkler trucks and milk tank trucks are satisfactory for transporting water.
2. All tanks, pumps, or hoses should be thoroughly cleaned and flushed out and disinfected before being used for this purpose.

FOOD SANITATION

Food-Borne Illnesses

1. Most food-borne illnesses are caused by bacteria. They are caused by toxins, chemicals and parasites.

a. Food-borne diseases are caused by bacteria directly attacking the body after introduction through milk or food.

Typhoid fever, undulant fever, diphtheria, dysentery, and tuberculosis are diseases that can be transmitted through infected milk or food.

b. Food poisoning is caused by toxins or poisons that are produced by bacteria in the food or by infections caused by bacteria.

Staphylococcal food poisoning, botulism, and salmonella infection are types of these diseases.

c. Chemical food poisoning can result from foods exposed to cadmium, antimony, or zinc coatings of food containers.

d. *Galvanized containers such as pails and garbage cans should not be used for the storage or cooking of liquids or foods, particularly acid foods. Such containers are coated with zinc, which dissolves on contact with food acids. Poisoning from this source can result in serious, sometimes fatal, illness. Such containers may be used for the storage of staple foods, such as flour, sugar, beans, and other bulk dry items.*

e. Parasites such as the tapeworm or the trichina worm, which causes trichinosis, are also carried by food, particularly pork or pork products that are not thoroughly cooked.

2. Food and water may be contaminated by man through poor hygiene and insanitary handling practices. Food handlers with boils, infected cuts, sore throat, or diarrhea may also be sources of infection.
3. Contamination may also be introduced by insects and rodents.
4. Radioactive fallout may also contaminate food and water, as may flood waters or other contaminating agents in natural disasters.

Prevention and Control of Food-Borne Illnesses

The following are some important factors in the prevention and control of food-borne diseases:

1. Meticulous personal hygiene and sanitary food handling practices by food workers.
2. Using only clean, unspoiled foods and safe water.
3. Maintaining clean facilities and establishments.
4. Protecting water and food supplies from contamination by splash, dust, flies, vermin, rodents and drainage.
5. Refrigerating perishable foods at temperatures below 45°F.
6. Proper cooking and processing of foods.
7. Preparing foods as close to serving time as possible and keeping them hot until served. (Keep potentially hazardous foods at or above 140°F.)
8. Avoiding foods and preparations which require a great deal of handling.
9. Sanitary disposal of refuse and wastes.

Note: *All food supplies should be checked and approved by health officials before being used for emergency feeding.*

SAFE FOOD HANDLING PRACTICES

Guidelines to Personal Hygiene

1. Do's

a. Wear clean, washable outer garments.

b. Keep hands scrupulously clean.
The most common source of contamination is dirty hands. Wash hands frequently with soap and water and always after using the toilet. Washing the hands after going to the toilet should become a fixed habit.

c. Use forks, tongs, spoons or ladle when handling or serving food; touch food with hands only when absolutely necessary. It is easy to learn to handle food with utensils and so avoid direct contact.

2. Don'ts

a. As previously mentioned, do not handle food if you have signs of illness, infection, or disease or have skin eruptions, festered cuts or sores, diarrhea, a sore throat, or a cold. Hands should be clean and free of cuts or sores. Fingernails should be trimmed and free of dirt.

b. Never sneeze, cough, blow your nose, or scratch your scalp over food.

c. Never moisten your fingers by putting them in your mouth.

d. Never smoke while working around food.
   (1) Ashes may fall into the food or into the utensils.
   (2) Saliva from a cigarette may contaminate your fingers.
e. Never touch the parts of clean and sanitized eating utensils that will come into contact with a person's mouth. Take hold of glasses at the bottom and cups and silverware by the handles.

Guidelines for Handling Food

1. Do's
a. Use a safe water supply.
b. Maintain clean, dry food storage areas free from rodents, pests, insects, etc.
c. Maintain clean, safe, controlled refrigerated storage.
d. Observe sanitary practices in food preparation and food service.
e. Maintain clean cooking and eating equipment and utensils through proper washing, sanitizing, and storage.
f. Maintain clean, safe and well protected facilities for garbage and refuse disposal.
g. Keep food exposure to a minimum and within the range of safe temperature. Safe temperatures range below 45°F—above 140°F.
   (1) Keep cold foods below 45°F.
   (2) Keep hot foods above 140°F.
   (3) Temperatures between 45°F and 140°F are critical because within that temperature range bacteria thrive and sometimes produce toxins.

   If you can't keep it hot or can't keep it cold, don't keep it.

2. Don'ts
a. Do not use the following food items which require a considerable amount of handling (handling increases the chances for contamination) and are known to be ideal media for the growth of bacteria:
   (1) Cream fillings, custards, cream sauces, creamed meats, gravies.
   (2) Salads of meat, fish, egg or poultry.
   (3) Meat and poultry dressing and stuffing.
   (4) Tongue and baked or boiled cured ham.
   (5) Hashes and croquettes.
   (6) Potato salad.
   (7) Ground meat and meat pies.

   If any of these items must be used, take utmost care in handling them. They should be prepared as near serving time as possible and must not be held over from one meal to another or left standing at room temperature.
b. Never use galvanized buckets or cans for the storing or cooking of liquids or foods particularly acid foods.
c. Never use raw (unpasteurized) milk.
   Raw milk is an ideal culture medium for bacteria. When the temperature of milk is above 45°F, bacteria will multiply rapidly.

3. *Emergency pasteurization of milk*

All milk and cream not used in cooking must be pasteurized to destroy disease-producing organisms and harmful bacteria. The following emergency methods of pasteurization will make raw milk safe for drinking.

a. Method No. 1
   Equipment needed:
   1. Two containers, one larger than the other, the smaller container should be large enough for the amount of milk to be pasteurized.
   2. An inverted perforated piepan or cake rack, to be placed inside of the larger container as a rest for the smaller container.
   3. A thermometer reading to 170°F, or higher.
   4. A spoon or stirring paddle.
   5. Clean, sanitized containers for storing the pasteurized milk.

   Procedure:
   1. Place water in the larger container. Bring it to the boiling point.
   2. Pour the raw milk or cream into the top section (smaller container). Place on rack over the boiling water and heat the milk until it reaches a temperature of 160°F. Stir continuously.
   3. Remove the container of milk from the heat and place it in running cold water in a sink or in a container of ice and water, and cool to 45°F. The best flavor is obtained when the hot milk is cooled rapidly.
   4. If it is to be stored, pour the cooled milk into sanitized containers. Cover and keep cool either in very cold water or in a refrigerator.
b. Method No. 2
   1. For use if no thermometer is available.

2. Bring milk just to the boiling point, stirring continuously to prevent scorching. Remove from fire at once. *Do Not Boil Milk!*
3. Cool quickly in a container that has first been sanitized, then cooled.
4. Cover and place container in a pan of ice (if available) or in a very cold water to cool.

4. *Care in handling milk*

If fresh milk is served as a beverage, it should be served in the original 1-quart or smaller containers as received from the distributor, or from a bulk container through an approved dispenser. All unused milk either in the opened original container or in an individual's drinking cup must be disposed of as food waste. Canned and powdered milk freshly opened are safe. Reconstitute them with safe water. *After such milk has been reconstituted it requires the same care as fresh fluid milk.*

Emergency Handwashing Facilities

1. Provide separate facilities for food workers so that they may wash their hands after using latrine and during preparation and service of meals.
2. Items needed
   a. Can containing soapy water for washing.
   b. Can containing clean water with 1 ounce of laundry bleach per 2 gallons added for rinsing.
   c. Paper towels and disposal receptacle.
   d. See Figure 15, Page 136, for details on construction and operation of the facility.
3. Alternate method
   a. Large can of soapy water.
   b. Large can of clean water with 1 ounce laundry bleach added per gallon.
   c. Small cans (No. 1, No. 303 or No. 2) for each of above.
   d. Two small wash basins.
   e. Waste receptacle for water.
   f. Paper towels and disposal bags.
4. Operation
   a. Fill small can (No. 1) with soapy water. Holding hands over the first basin pour on soapy water and wash hands thoroughly.
   b. Dump basin contents into liquid waste receptacle.
   c. Fill the other can (No. 303 or No. 2) with clean rinse water. Rinse hands over other basin.
   d. Dump basin contents into liquid waste receptacle.
   e. Dry hands with paper towels. Dispose of towels.

DISHWASHING

Equipment and Materials Needed for Washing Dishes by Hand:

1. Scrapers
2. A receptacle for dish scraps
3. A spray or other rinsing device for prerinsing dishes
4. A 3-compartment dishwashing sink—1 sink for washing, 1 for rinsing, and 1 for sanitizing
5. Detergent or soap
6. Wire baskets or perforated pails for holding dishes when immersing in disinfecting solution or in scalding water
7. Scalding water or liquid household bleach (5.25%) solution for sanitizing dishes

Procedure for Hand Dishwashing:

1. Scrape waste from dishes into receptacle
2. Prerinse the dishes to prevent overloading the dishwater with soil and bacteria
3. Sink No. 1
   a. Wash dishes thoroughly in hot water (about 110° to 120° F.) and detergent or soap. As the temperature of the washwater decreases, change and add fresh cleanser. A detergent or soap is a cleansing agent, *not* a sanitizing agent.
4. Sink No. 2
   a. Rinse dishes in clear hot water (about 110° to 120° F.).
   b. Place dishes in a clean wire basket for sanitizing. Arrange so all inside surfaces are reached by sanitizing solution.
5. Sink No. 3
   a. Sanitize dishes in sink No. 3 by immersing them (using wire basket) in hot water (at least 180° F. for 2 minutes or 212° F. for one-half minute). Keep the water hot by a heating arrangement under the sink, by an automatic boosting device, or with a thermostatically controlled boiler that will deliver water of 180° F. to the sink.
   b. If hot water is not available sanitize dishes by soaking for two minutes in a chlorine solution. An approved solution is made by mixing 1½ teaspoonfuls of liquid household bleach to a gallon of water.
   c. Remove dishes and place on drain board to air-dry and cool. *Never* dry with towels.
   d. Remove to a clean, protected place. Stack the dishes. Invert glasses and cups on racks.

Machine Dishwashing

1. Follow steps 1, 2, 5c, and 5d (above) under procedure for hand dishwashing.
2. Use machine for steps 3, 4, 5a, or 5b.
3. Dishwashing machines vary in design and construction. Follow manufacturer's instructions for loading, amount of cleanser, washing and rinsing, temperatures, and repair.

Single-Service Articles (Use once and discard)

1. Single-service articles should be stored in closed cartons or containers which protect them from contamination.
2. Such articles should be handled and dispensed in such a manner as to prevent contamination of surfaces which may come into contact with food or with the mouth of the user.
3. All food-service establishments which do not have adequate utensils should use single-service articles.

CLEANSING EMERGENCY EQUIPMENT

Salvage Containers for Use in Feeding

1. In an emergency it may be necessary to use salvaged containers of iron or steel for cooking food in quantity. Before use as cooking vessels, these containers must be cleansed, scoured, and sanitized.
2. *Avoid the use of containers or drums as food storage or cooking vessels if they contained petroleum products, herbicides, rodenticides, insecticides, paints, chemicals and fertilizers.*
3. Procedure for cleansing:
   a. Wipe out foreign matter.
   b. Fill containers with water, add detergent, and boil.
   c. Empty soiled water. Use an ordinary household abrasive to scour thoroughly. If ordinary household abrasive cleanser is not available, make a mixture of sand, fine gravel, and water. Remove any foreign matter deposited in crevices or under rolled rims.
   d. Rinse thoroughly with hot water several times.
   e. Repeat the above procedures if necessary.
   f. To insure the cleanliness and safety of the container for use as a cooking vessel, it may finally be "blued."
4. *Bluing Utensils*

a. The purpose of bluing is to prevent rust. Aluminum and tin utensils should never be "blued" as the high heat necessary to "blue" a utensil will melt them.

b. Directions.
   (1) Wash and dry the utensil thoroughly. Place over a wood fire that has both flames and live coals. This burns out any remaining residue and opens the tiny pores of the metal.
   (2) Plunge the utensil in hot water and again scour and dry thoroughly.
   (3) Coat the utensil inside and out with a thin film of lard, oil, or other cooking fat (except bacon, ham, or other fats which contain salt that will corrode the metal).
   (4) Place the utensil in a hot oven (325° to 400° F.) for about an hour. If no oven is available, place upside down over glowing coals, being careful not to burn away the grease.

c. The metal will slowly turn blue as the heat does its work. The spread of color is a guide in judging the progress of bluing. This heat treatment melts the grease into the surface, closes the pores of the metal and gives the utensil a smooth, glazed surface that resists rust.

Use of Tin Containers for Cooking

1. The standard tin can is made of sheet metal with a 1.5 percent tin coating. Never heat the can when it doesn't contain liquid or food because the thin film will crack and burn away. This is a protective coating, and should remain on the can. Some cans are enameled and have a gold-colored interior. If these cans are to be used for cooking, to prevent chipping, charring or other unaesthetic condition or product, this enamel should first be burned off, then the metal should be thoroughly cleaned.

DISPOSAL OF WASTES

Garbage

1. Includes food wastes from kitchen, and food left on plates by diners.
2. Methods for disposal
   a. Burying
      (1) Dig trench or pit 4 or more feet deep.
      (2) Dump garbage in trench.
      (3) Pack down in layers.
      (4) Cover exposed layer with a few inches of dirt at end of each day.
      (5) When pit is filled, cover with earth and pack well by tamping or running over with a crawler tractor.

(6) Cover an abandoned garbage site with at least 2 feet of mounded earth.

b. Incineration.
   (1) Requires removal of all excess moisture.
   (2) Good fire must be started before adding garbage.
   (3) Garbage should be added in small amounts.
   (4) Additional fuel or combustible wastes must be added as needed to keep a good fire going.
   (5) Unburned residue must be buried and covered with at least 2 feet of mounded earth.

Trash

1. Includes cans, glass, other noncombustible wastes and combustible wastes.
2. Methods for disposal
   a. Cans.
      (1) Wash and use as substitutes for cooking and eating utensils.
      (2) Otherwise, open both ends, flatten, and bury with garbage.
   b. Glass.
      (1) Wash and, if needed, use as substitutes for eating utensils.
      (2) Otherwise, break and bury with garbage. (Breaking will reduce volume and save work of digging and covering.)
   c. Other noncombustible wastes.
      (1) Bury with garbage.
   d. Combustible wastes.
      (1) Separate from wet wastes and keep dry.
      (2) Burn in incinerator with garbage.

Liquid Waste

1. Includes dishwater and other liquid wastes from kitchen and dining areas.
2. Methods for disposal
   a. If needed, save usable grease and waste fat in tin cans for cooking use.
   b. Dispose of other liquid wastes in soakage pit. (See Fig. 19, Page 141)
      (1) Locate soakage pit at minimum of 25 feet from kitchen area.

Toilet Facilities

1. If latrine facilities are not already located at a feeding site, it will be necessary to provide some type of facility for the exclusive use of food workers.
2. Figure 20, Page 142, shows the suggested construction of such a facility.
3. In providing these emergency facilities, the following precautions should be taken:
   a. Facilities for men and women should be well separated, and located at least 50 feet from areas used for storage, preparation, and service of food.
   b. A handwashing facility should be provided near the toilet area and stocked with a supply of water, soap, paper towels, and a disposal receptacle.
   c. The following ratio is suggested for food workers:
      (1) Men—1 seat and 1 urinal per 10 workers.
      (2) Women—1 seat per 8 workers.
   d. Latrines should be kept well lighted at all times, doors and windows screened, if necessary.

NOTE: If temporary latrine facilities must be provided for diners, the same type construction as that suggested for food workers may be adapted. Latrines for diners should be located at least 300 feet from the serving area.

4. *Operation of outdoor pit latrines.*
   a. Keep clean. Assign full-time monitor if needed.
   b. Provide toilet paper. (Overturned No. 10 cans protect paper against weather.)
   c. Close latrine when no longer needed.
      (1) Cover all pit contents with minimum of 2 feet of earth and pack down firmly.
      (2) Spray area with oil or DDT.
      (3) Mound earth 12 to 18 inches above pit and pack firmly.
      (4) Mark the site "CLOSED LATRINE."

If animals are likely to unearth latrine contents, mix broken glass, fencing or heavy stones with earth used to fill the pit.

RADIOACTIVE FALLOUT CONTAMINATION

Decontamination of Food and Water

1. If food should become contaminated the fallout particles can usually be removed. Consumption of heavily contaminated food and water could cause internal radiation damage.

a. Most fresh fruits and vegetables can be washed or peeled to remove the outer skin or leaves.
b. Food in cans, covered jars, or other closed containers would not be contaminated. However, the container should be decontaminated by washing or wiping the fallout material off the containers.
c. Similar cleaning methods appropriate to the type of food involved would, in most cases, be sufficient.
d. Properly dispose of peelings, wash water, cleaning rags, and other materials contaminated in the decontamination process.
e. Since fallout particles will only be relocated, remove these materials to a remote place and cover with earth. In time, radioactive decay will reduce the radiation to acceptable (non-dangerous) level.

2. Surface water supplies, such as rivers, lakes and open reservoirs may be contaminated by fallout.
   a. Boiling or the use of a disinfectant is of no value in removing radioactivity.
   b. Many fallout particles are so heavy that they quickly settle to the bottom.
   c. The regular water treatment (coagulation, sedimentation, filtration) of public water systems will remove most of the fallout contamination. Very little of the dangerous fallout material would be dissolved in the water.
   d. Water softener or ion exchange systems used in many buildings and homes will remove most of what little fallout may be dissolved in the water in the same manner as they do the chemicals which cause "hard water."

CHECKLIST FOR SANITARY OPERATION OF A FEEDING FACILITY

Has the assistance of health officials in checking the facility been requested?

Health requirements

1. Are workers free from infectious disease?
2. Are workers' hands or other exposed parts of the body free from cuts or sores?
3. Are clean washable clothing or uniforms worn by workers?
4. Are workers' hands washed thoroughly and frequently, always after using toilet?
5. Are workers' fingernails kept clean?

Kitchen, dining area, or storage place

1. Is ventilation good?
2. Are doors and other openings covered with insect screens?
3. Are floors clean? Are they cleaned after food preparation and service, not during these operations? If a dirt floor is used, is it raked daily and kept dry? Can floor covering or racking be installed?
4. Is lighting adequate?
5. Are the worktables, serving counters, and shelves kept clean and dry?
6. Are refrigerators kept clean and is refrigerated food stored properly?
7. Is the outside area kept clean and free from debris?

Cooking and eating utensils

1. Are utensils thoroughly washed, sanitized, air-dried, and stored in clean place after each meal?
2. Are utensils protected from dust, splash, or other contamination?
3. Are utensils free from chips or cracks and easily cleaned?

Water supply

1. Is the water source and method of handling throughout the feeding facility checked by proper authorities?
2. Is water supply convenient to points of use and properly stored?
3. Is water chlorinated, boiled, or otherwise disinfected?

Refrigeration

1. Is food refrigerated to prevent spoilage? (If refrigeration is inadequate or food has to be kept for any time, avoid serving such perishables as cream sauces, mixed salads, hamburgers, bread puddings, custards, meats, poultry stuffing, and similar foods.)
2. Are leftover cooked foods discarded when refrigeration is inadequate?
3. Is only enough food for present use prepared?

Protection of food supply

1. Are foods protected from dust, flies, rodents, vermin, and other sources of contamination?
2. Are food supplies properly covered and stored?
3. Are food supplies handled from receipt to preparation in a sanitary manner?

4. Are paint, chemicals, and insecticides stored at safe distances from the food?
5. Are meat and meat products kept in good condition, and only Government inspected meats and meat products used when possible.
6. Are canned goods with breaks or bulges in can discarded?
7. Is all fluid milk pasteurized?

Dish and utensil washing facility

1. Is hot water (100° to 212° F.) available for washing and sanitizing utensils?
2. If hot water is unavailable, are dishes and utensils sanitized by chlorination or other disinfection?
3. Are cleaning agents (detergents, soaps, powders) in ample supply and properly used?
4. Are racks for air-drying and storage in ample supply and kept clean?
5. Is use of dish towels kept to absolute minimum?

Handwashing facility

1. Are handwashing facilities adequate and convenient?
2. Is a separate handwashing facility convenient for food workers?
3. Are soap and paper towels provided?

Toilets, standard or improvised

1. Are they properly constructed and separately located for food workers and for others at the feeding site?
2. Are they maintained in a sanitary manner?
3. Are they stocked with an adequate supply of toilet paper?
4. Are handwashing facilities provided and employees directed to use them by prominently posted signs?

Garbage and refuse disposal

1. Are garbage cans free from leaks? Do they have tight-fitting covers? Are they properly cleansed?
2. Is garbage separated into burnable and nonburnable waste, and taken from feeding station daily?

FOOD SERVICE MANAGEMENT

ORGANIZING FOOD SERVICE FACILITIES

Establishing a Temporary Food Service Unit

a. In some disaster situations, it may be necessary to temporarily occupy a suitable building and acquire the essential equipment to set up and operate an emergency feeding unit. The unit may be one in which both shelter and mass feeding services are provided for disaster victims or it may be established only as a central kitchen.

b. The desirable features for a safe and healthful facility are:
   (1) A location outside the danger area but as convenient as possible to those affected by the disaster.
   (2) A building that is fireproof and moisture-resistant, in good repair and having floors strong enough to withstand weight of equipment and heavy traffic.
   (3) Good lighting and ventilation.
   (4) Adequate toilet facilities or space to provide them.
   (5) Adequate supply of safe water for drinking, cooking and other purposes.
   (6) On the street floor for convenient delivery, food distribution and disposal services.

Work Areas

a. The goal of a good working arrangement is achievement of a direct and continuing flow from the point of delivery to the point of waste disposal. Efficient arrangement of work areas influences the number of persons that can be fed and the time and labor required to do the job.

b. Before establishing a feeding facility consider the principles of good layout, the arrangement of equipment and the flow of traffic as they pertain to the following work areas:
   (1) *Receiving area*
   This area should be close to the road, with enough space for trucks to maneuver.

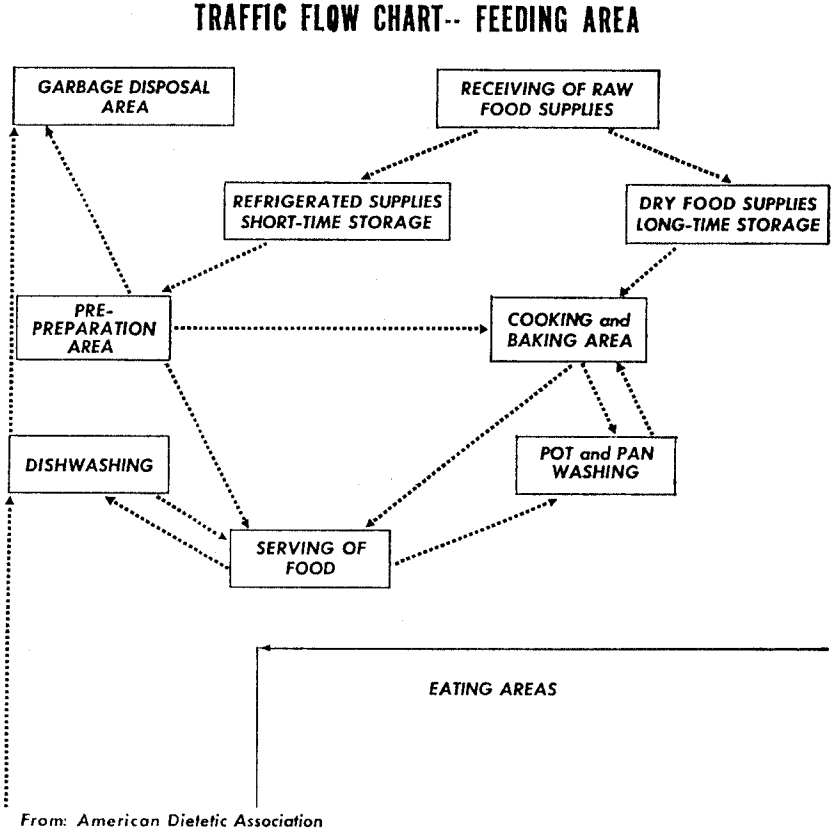


FIGURE 4.—Traffic flow chart—feeding area.

(2) *Storage area*
   (a) This area should be between the receiving and the preparation and cooking areas.
   (b) For dry and staple storage, equip the area with tables, shelves and off-floor racks.
   (c) Provide suitable refrigeration facilities for refrigerated storage.

(3) *Preparation area*
   (a) If all food is in canned or other ready-to-cook form, a preparation area may not be essential.
   (b) For preparing fresh produce, the following are needed: work tables or benches; cutting board; sink (or other large container) and drainboard for washing fruits and vegetables; storage space for knives and utensils; containers for trash and garbage.

(4) *Cooking and baking area*
   (a) This area should be located between the storage and serving areas.
   (b) Group together stoves, ovens and other preparation equipment, such as work tables, storage for cooking pots, pans, knives, can openers, paddles and other utensils.
   (c) For greatest convenience cooking facilities should be located in the center of the kitchen.

(5) *Dishwashing area*
   (a) This should be near the serving and preparation areas and be equipped with: a flat bench, table or counter for stacking dirty dishes and utensils, containers for plate waste and trash, a mechanical dishwasher or, if dishes are to be washed and sanitized by hand, a three-compartment sink (or 3 large containers) for washing, rinsing, and sanitizing, and drainboards or tables for air drying clean dishes, pots and pans.
   (b) If disposable paper supplies are used, a washing area for pots and pans only may be sufficient.

(6) *Serving area*
   (a) This area should be near the preparation area.
   (b) To save time and labor and to accommodate as many people as possible in disaster the serving area should be arranged for cafeteria-style service or line feeding, and equipped with several counters for speedier service.

(7) *Disposal areas*
   (a) These areas should be in enclosed places away from the preparation, serving and dining areas.
   (b) Provide covered containers and facilities for trash, liquid waste, and garbage disposal.
   (c) Provide cleansing and disinfecting supplies.

Suggested Minimum Equipment For an Indoor Kitchen

Equipment for food preparation

Essential Equipment	*For 200 diners*	*For 500 diners*	*For 1,000 diners*
Range, with oven, gas or blue flame oil; or	6 burners	8 burners (two 4-burner units)	12 burners (two 6-burner units)

Suggested Minimum Equipment For an Indoor Kitchen (Continued)

Equipment for food preparation

Essential Equipment	*For 200 diners*	*For 500 diners*	*For 1,000 diners*
Camp range for coal or wood, with oven. (Oven not necessary but desirable for long-term feeding.)	6 covers	6 covers	8 covers
Stock pot (6-gal.)	2	4	6
Dish pan (18-in.) *or*	3	4	4
Compartment sink	1	2	2
Saucepan (2-qt.)	0	2	3
Saucepan (1-qt. lipped)	2	2	2
Water pails (3 gal.)	3	3	4
Covered garbage can or pail	2	3	4
Graduated 1-qt. measure	1	2	2
Graduated 2-qt. measure	1	2	2
Water tank if water is to be brought in	400 gal.	1,000 gal.	2,000 gal.
Knives:			
Bread	2	2	3
Butcher	2	2	4
Paring, some with loop handles	4	6	8
Sandwich spreader	4	4	6
Measuring spoons and cups	1 set ea.	2 sets ea.	2 sets ea.
Can opener (wall or table type)	1	1	1
Vegetable brush	2	3	4
Desirable to extent available			
Simple coffee urn with bag, ring, and faucet (10-gal.)	2	2	2
Frying pan	2	2	4
Baking pan to fit oven (2¼ in. deep)	Number and size depend on size and number of ovens.		
Mixing bowls (9-qt.)	3	4	6
Colander (13¾ in. by 5¾ in.)	1	1	2
Food chopper (3-lb. capacity)	1	1	2
Basting spoons (14-in.)	2	3	4
Split spoon	1	2	2
Cook's fork (18-in.)	2	2	4
Pancake turner (14 in.)	2	2	4
Wire whip (14- or 16-in.)	1	2	3
Cutting board for sandwiches, 2-in. by 18-in. by 24-in.	2	2	4

Suggested Minimum Equipment For an Indoor Kitchen (Continued)

Equipment for food service

Essential Equipment	*For 200 diners*	*For 500 diners*	*For 1,000 diners*
Coffee pot (8-qt.) for serving coffee	4	4	6
Pitchers (1-gal.) for beverages (for table use)	4	8	10
Deep ladle 8-oz. (for soup)	2	3	4
Plates, cups, spoons, forks, etc.	As needed for 200	As needed for 500	As needed for 1,000
Desirable to extent available			
Trays (cafeteria style)	4	6	8
Bowls for sugar	4	6	8
Folding or trestle table with legs	Number depends on size of table and space.		

Equipment for cleaning

Essential Equipment	*For 200 diners*	*For 500 diners*	*For 1,000 diners*
Mop	1	1	2
Broom	1	1	2
Dustpan	1	1	2
Scrubbing brushes	1	2	2
Compound for sterilizing dishes	As needed		
Dishcloths	As needed		
Cleaning cloths	As needed		
Paper or cloth hand towels, soap, soap powder for dishes, scouring powder	As needed		
Desirable to extent available			
Mop wringer with pail (attached)	1	1	2
Chore boys or steel wool	As needed		

Miscellaneous

Essential Equipment	*For 200 diners*	*For 500 diners*	*For 1,000 diners*
Knife sharpener	1	1	1
Box or holder for knives	1	1	1
Matches	As needed		
Pot holders	8	8	12
Household bleach	To purify water as necessary		

Suggested Minimum Equipment For an Indoor Kitchen (Continued)

Miscellaneous (Continued)

Desirable to extent available			
Bread box or covered metal container with holes punched in the cover	As needed		
Sterilized new galvanized cans for storing of bulk, dry, staple foods	Number depends on stock to be kept on hand		
Oil cans with screwtop filler	Number depends on size of oil stove		
Hammer	1	1	1
Shears	1	1	1
Clock	1	1	1
Ladder	If needed		
Kitchen stool	Number depends on number of workers and space		
Scale for weighing recipe ingredients	1	1	1
Pulley for hanging clothesline	Number depends on number of workers and space		
Cooks' caps and aprons	Depends on number of workers and laundry facilities		

Equipment for accident prevention

Essential Equipment	*For 200 diners*	*For 500 diners*	*For 1,000 diners*
First aid 16-unit kit	One or more, dependent on size of feeding station		
Fire extinguisher	One or more, dependent on size of feeding station		

CONVERTING AN EXISTING EATING PLACE FOR EMERGENCY FEEDING

Disaster Conversion Suggestions

1. In some disaster situations feeding establishments that are undamaged or only slightly damaged may be able to continue feeding operations without interruption. However, it may not be possible to continue normal operating procedures if the work load is greatly increased. Conversion of the establishment to a simplified disaster set-up would permit the feeding of larger numbers of persons.

2. The following are disaster conversion suggestions for restaurants, cafeterias, clubs, school lunchrooms, institutional and hospital dining rooms and other commercial and industrial eating places.

a. *Before an emergency—plan*

Before an emergency, make a disaster plan that will include:

(1) A sketch of the physical layout of the establishment.
(2) The location of the kitchen and the dining areas in relation to the street and their position within the building.
(3) Determination of methods and areas of expansion to provide additional eating space.
(4) An estimate of the number of extra persons the establishment could feed in an emergency.
(5) Places where diners could dispose of trash and waste.
(6) A plan for the emergency washing of soiled dishes and utensils.
(7) A plan for the changes necessary in the kitchen and serving areas to convert from table-type to cafeteria line service.
(8) Charting and labeling steam, power, water and gas connections for emergency purposes.
(9) Establishment of the priority use of any food, equipment and paper eating supplies on hand at the time of disaster.
A plan for the safeguarding of food supplies.
(10) An estimate of the number of additional food workers required.
(11) Assignment of specific emergency duties to each staff member and to extra workers.
(12) A list of work stations to be manned and the size and makeup of teams required for each station.
(13) Arrangement for onsite orientation and instruction of staff members on the emergency plan.
(14) Arrangement for workers to take the Basic Emergency Mass Feeding Course.

b. *After disaster strikes—procedures*

After disaster strikes, take the following steps:

(1) Premises, supplies and equipment.
(a) Convert table-type operations into self-service set up.
(b) Establish space for the formation of several traffic lines.
(c) Post signs telling people where to go to eat.
(d) Direct traffic flow from entrance to exit. Under normal conditions, people usually go in and out the same door. Under emergency conditions, a separate exit will facilitate the flow of traffic in and

out of feeding area, and eliminate two-directional traffic at the entrance.

In some table-type establishments traffic flow could be directed through the kitchen where food may be served from the steamtable, other tables, or directly from the ranges or grills. Lines may enter the kitchen to pick up food and proceed to the eating area.

(c) If utilities are disrupted, put any emergency or standby equipment into operation. For example: Convert stoves that burn natural gas to operate on bottled gas. Hook up steam-powered equipment to available portable steam generators or pipe steam into the plant from an emergency source. If cooking equipment is not usable, but serving supplies and equipment are, use the establishment as a feeding station to serve prepared food brought from a central feeding facility in thermos or other insulated containers.

(2) Personnel
- (a) Organize staff into teams to prepare, transport and serve the food and dispose of trash and garbage.
- (b) Assign staff work-hours for 24-hour feeding service during the emergency.

(3) Menu
- (a) Simplify the menu and service of food during the extreme emergency.
- (b) Use promptly any uncontaminated fresh food on hand to avoid spoilage and waste. Use canned, packaged foods, and other nonperishables after fresh food supplies are exhausted.
- (c) In the period immediately following emergency, limit menu items to foods eaten out of hand and easy to handle such as sandwiches or fruit.
- (d) Limit the menu after first emergency hours to one-dish, bowl-type meal and a beverage. Avoid monotony by adding a little variety. Additions are desirable if and when supplies, staff and facilities permit. Simplification will help stretch the customary 2 or 3-day inventory of food supplies.
- (e) Discontinue the following: Appetizers, salads, individual cream, butter and other side dishes (unless prepackaged and available), pastries and desserts that have to be prepared.

(4) Food service
- (a) Be prepared to serve meals on a 24-hour basis.
- (b) Discontinue table and regular counter service.
- (c) Bring food to the serving area in the containers in which they were cooked and serve from the containers.
- (d) Use single-use paper eating utensils.
- (e) Serve a generous portion to each diner when menu is limited.

DEVELOPING AN EMERGENCY FOOD RESERVE FOR MASS FEEDING

1. In disaster those who are affected must be sheltered, fed and clothed and given medical and nursing care. When in need and in trouble people instinctively turn for help to the institutions in the community that regularly serve the public.

2. At the outset a disaster stricken community has only its own local resources with which to work. Therefore, eating establishments and institutions that serve meals to the public have an obligation to be prepared for emergency feeding.

3. Establishments that are equipped to serve meals to groups, that maintain a food inventory, and can provide experienced food service staff make good mass care centers and central feeding stations in disaster.

Following are examples:

a. Schools, churches and lodge halls or similar community buildings are often utilized as mass care centers for sheltering and feeding those affected by a disaster.

b. Restaurants, diners, cafeterias, clubs and other commercial eating places are often used in disaster as:
   (1) Feeding centers where food is prepared and served on the premises.
   (2) Auxiliary kitchens where food is prepared for transportation to serving stations away from the premises.

4. Food service departments of hospitals and other group care institutions have the responsibility in a disaster of providing meals for their regular patients and staff as well as for any additional patients who are victims of the disaster.

Planning for Emergency Feeding

a. It is impossible to predict in advance of disaster the magnitude of the need and the place and time when emergency feeding services may be required. All feeding establishments should be organized so that they can meet whatever disaster

conditions may exist with a minimum of interruption in service.

b. In spite of the many uncertainties concerning need and availability of supplies in disaster, some things can be done before an emergency to assist staff in meeting food needs when an emergency arises.

c. A reserve stockpile of foods will enable a feeding establishment to serve the first emergency meals and to continue feeding operations without interruption, when called upon to do so. They need only to draw upon the reserve supplies until the community disaster relief resources are organized.

Food Stockpile for Group Feeding Establishments

a. Factors to consider in selecting appropriate foods for an emergency stockpile:
   (1) The storage space and the money available will influence decisions on what foods and how much to include.
   (2) Other factors are:
      (a) Familiarity and acceptability of the food by the majority of the group to be fed.
      (b) Suitability for all age groups.
      (c) Nourishment, variety and keeping qualities under storage conditions.
      (d) Ease of preparation and service.
      (e) Palatability in case food must be eaten "as is" due to lack of water for cooking and means of heating.
      (f) Completely edible so as to avoid waste and leftovers.
      (g) Can be used in the normal daily meals of a cafeteria or dining room and be replaced in the stockpile with fresh items (rotation of stock).

b. *Makeup of stockpile* (based on "Food for Fitness, a Daily Food Guide.")
   (1) Milk group
   Evaporated milk, condensed milk, dried milk; processed cheese products.
   (2) Meat group
   Canned meats, poultry, fish and meat alternates; canned meat with vegetables, rice, noodles, macaroni or beans; condensed soups containing meat, poultry, fish or legumes.
   (3) Fruit and vegetable group
   Canned fruits, vegetables and juices and dried fruits.
   (4) Cereal-bread group

Ready-to-eat packaged cereals; crackers and cookies; canned breads, puddings, cakes; canned macaroni, spaghetti, noodles, rice.

   (5) Other foods
   Spreads such as peanut butter and other nut butters; jams, jellies, preserves; relishes; sweets, such as sugar, hard candy, gum, instant puddings; miscellaneous items such as: instant coffee, tea, cocoa, dry cream products, bouillon products; nuts, flavored beverage powders, seasonings and flavorings.

c. *Food stockpile for special groups*
   (1) Infants and expectant mothers
      (a) Babies need formulas and pregnant and nursing mothers need extra protein, calcium and vitamins.
      (b) Food that will provide for these special needs are: Evaporated and nonfat dry milk; sugar or corn syrup; safe water for formulas; strained fruits and vegetables; cereals—infant and breakfast; citrus fruit or tomato juice.
   (2) Schools, churches and similar "one meal" food service facilities that are often designated as feeding centers in disaster might consider including formula ingredients, infant foods and some breakfast cereals in the stockpile.
   (3) Hospitals and other group care institutions.
      (a) An emergency feeding plan for an institution must be tailor-made to fit the conditions of the establishment and the types of emergencies most apt to occur in the community.
      (b) An emergency food stockpile for patients, including infants, the chronically ill, and those on therapeutic diets should be planned by the dietary department in cooperation with the medical staff of the hospital or institution.
      (c) Foods to back up the feeding plan can be included as part of the emergency reserve in the regular food inventory of the institution.

Management of a Food Stockpile

a. *Rotation of stock*
   (1) Any eating establishment or institution that serves meals regularly can develop an emergency food reserve from the usual food inventory.

(2) The reserve stocks are channeled into normal food service, and as they are used are immediately replaced with fresh stocks.

(3) Rotation of stock serves several purposes. It assures that:

(a) The emergency food supplies are always in good condition.

(b) The group to be fed and the food service staff know and like all the foods.

(c) The food stocks won't be wasted if a disaster never happens.

b. *Storage and care of the food stocks*

(1) Never store all your emergency food supplies in a basement. In a flood disaster it might be impossible to reach them. Anything covered with flood water is contaminated and unfit for human consumption unless it is hermetically sealed.

(2) Leave boxed and packaged foods in their original wrappings to protect them from insects and rodents.

(3) Label and date the foods that require frequent replacement. Keep older supplies at the front of the stockpile.

(4) Food stored in freezers can be counted as part of the reserve.

(5) In an emergency use perishable foods from refrigerators and freezers first.

ORGANIZING FOOD SERVICE WORK

1. Feeding large groups is a complex task that requires good overall planning and coordination.
2. Any disruption or breakdown of automatic food service machinery can further complicate the feeding task. Sophisticated equipment may have to be replaced by human labor and improvised equipment.
3. Disaster mass feeding operations requires planning, coordination and organized effort as does feeding under normal conditions.
4. Because the number of people doing the work is small in relation to the number of people being fed, the feeding staff must work as a team to plan, prepare and serve to large groups.
5. To perform the tasks involved in carrying out the menu, food service workers need to master techniques and skills

that simplify the work, reduce fatigue and promote greater efficiency.

6. **Teamwork and coordination** by the various food service workers units are required to get the work done efficiently on time. Coordination of all parts of the operation is also essential for smooth functioning.

a. *The four major divisions of work in any feeding operation are:*

(1) Planning the meals, making the menus and procuring the food

(2) Preparing the food

(3) Serving the meal

(4) Cleaning up

b. *The duties of food workers in carrying out the four phases of a feeding task include:*

(1) Planning

(a) Plan and post menus, recipes, work schedules, indicating numbers to be fed, amount of food to be prepared and size of servings.

(b) Requisition food, equipment and other supplies and receive, check, store and allocate supplies to work units.

(c) Keep necessary records.

(d) List jobs to be done and divide them into basic work units. Assign jobs of feeding team.

(e) Supervise workers.

(f) Enforce sanitary and safety practices in the feeding area.

(g) Maintain liaison with other feeding units throughout the disaster area.

(h) Recruit and assign licensed drivers for automotive units in mobile operations.

(2) Preparing food

(a) Follow menus, recipes and work schedules.

(b) Schedule preparation of food to have it ready and in good condition at serving time.

(c) Plan, collect and assign necessary equipment and food ingredients.

(d) Arrange work space for efficiency.

(e) Deliver food to serving counters.

(f) Coordinate duties with those of the serving and cleaning groups.

(g) Keep working areas clean.

(h) Arrange for proper storage of disposal of leftovers.

(i) Deliver soiled cooking utensils to dishwashing unit.

(j) Keep close watch for spoiled or contaminated food.

(k) Adhere to sanitation and safety regulations.

(3) Serving food

(a) Before the meal is served:

Decide upon the tasks involved; make a serving schedule and assign work duties; assemble the serving supplies and equipment; select the utensils and containers to be used if the food is being transported; organize and arrange the serving and dining areas.

Systematize food arrangement on counter—cold foods first, hot foods last; assemble food accompaniments—such as salt, pepper, cream, sugar and drinking water and place them at point of use; wrap knives, forks and spoons in napkins and place them at start or end of the serving line; stack paper cups and bowls on clean trays, towels or paper, inverting them for easy grasping; establish lines for movement of diners from serving to eating area.

(b) When ready to serve meal:

Have proper serving utensils handy; determine portions to be served; assure enough servers for each station; serve food attractively; avoid overfilling and spilling; when serving thick soup or stew, see that everyone gets a fair share of both meat and vegetables; keep prepared food covered when not being served; keep serving area clean and neat "as you go."

(c) After meal is served:

Clear the serving counter; deliver leftover food to kitchen area for storage or disposal; dispose of trash and waste from serving area.

(4) Cleaning up

(a) Sanitation and cleanup includes:

General cleanliness and sanitation of the food service area; care and issuance of cleaning supplies to other team groups; provision of proper toilet and handwashing facilities and safe drinking water; proper handling of food and equipment; dishwashing and general cleaning.

(b) Before the meal is served:

Decide upon the tasks involved; assign work duties to each member of group; issue cleaning supplies to all food units; clean and sanitize floors, tables and serving counters; set up trash and waste collection and disposal facilities; prepare the facilities for dishwashing.

(c) After the meal is served:

Wash and sanitize all soiled dishes and utensils; store properly; check all working surfaces, tables, shelves and ranges for cleanliness; wash and rinse dishcloths, serving towels, and cleaning cloths—and hang them to dry in the air; sweep or mop floors and dust chairs; dispose of garbage and trash and sanitize the containers; put away cleaning supplies and equipment.

Staff Requirements for Feeding Facilities

a. Staff needs for either stationary or mobile emergency mass feeding facilities depend upon a number of factors such as the experience of available workers, the type and extent of disaster, the types of meals served, facilities available, and other variables.

b. The following table of staff organization for the various kinds of feeding facilities is intended only as a guide for estimating personnel requirements for one shift.

Food preparation and service staff for indoor (shelter) facilities

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Supervisors	1	2
Food preparation:		
Cooks	3	4
Assistant cooks	4	8
Kitchen helpers	12	24
Servers:		
Main dish	2	4
Bread or sandwiches	2	4
Beverage	2	4
Traffic directors	4	6
Cleanup:		
Dishwashers	2	3
Helpers (trash and garbage disposal)	2	3
Total	34	62

Food preparation staff for auxiliary kitchens

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Supervisors	1	2
Cooks	3	4
Assistant cooks	4	8
Kitchen helpers	12	24
Total	20	38

Food service staff for feeding stations

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Supervisors	1	2
Servers:		
Main dish	2	4
Bread or sandwiches	2	4
Beverage	2	4
Traffic directors	2	4
Cleanup:		
Dishwashers	2	4
Helpers (trash and garbage disposal)	2	4
Total	13	26

Food preparation and service staff for a mobile convoy

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Drivers (per vehicle)	1	1
Supervisor—Chief of unit	1	2
Supply officer: Supplies and equipment	1	2
For each mobile kitchen (food preparation):		
Cooks	2	4
Assistants	2	4
Helpers	4	8
For each mobile canteen (serving only):		
Servers:		
Main dish	2	4
Bread or sandwiches	2	4
Beverage	2	4
Traffic directors	2	4
Helpers (trash and garbage)	2	4
Total	21	41

Food preparation and service staff for a mobile kitchen

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Drivers	1	1
Supervisor	1	2
Food preparation:		
Cooks	2	4
Assistants	2	4
Helpers	4	8
Servers:		
Main dish	2	4
Bread or sandwiches	2	4
Beverage	2	4
Cleanup:		
Cooking equipment	1	2
Helpers	2	4
Traffic directors	2	4
Total	21	41

Food service staff for a mobile canteen

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Drivers	1	1
Supervisor	1	2
Servers:		
Main dish	2	4
Bread	2	4
Beverage	2	4
Traffic directors	2	4
Helpers	2	4
Total	12	23

Food preparation and service staff for improvised outdoor kitchens

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Supervisor	1	1
Supply officer	1	1
Cooks	5	8
Cooks helpers	5	8
Water tender	1	2
Fire tender	1	3
Servers	8	12
Traffic directors	2	4
Cleaners	2	4
Total	26	43

Guides to the Care and Storage of Food

a. Proper storage and care of food are part of good food service management. Under disaster conditions, storage facilities may not be ideal, but the principles that contribute to good storage practices should be observed as closely as possible.

b. Good storage discipline is especially important in emergency kitchen facilities, whether indoor, mobile or outdoor, because of the greater risks of spoilage, contamination or other waste.

(1) *Dry storage*

(a) Keep in the storage area all foods not in use.

(b) Keep the storage area clean, orderly, well ventilated, dry and cool.

(c) In order to protect foods from dampness, store them on shelves and slatted floor racks. Leave a 2-inch airspace between shelves and walls to permit air circulation. Label and place large or heavy cartons, boxes, cases, cans, and containers on deeper bottom shelves.

(d) Store such staples as flour, sugar, beans, and other bulk dry items in clean covered metal cans or other clean covered containers. Store bulk potatoes, onions, and other root vegetables in open containers or baskets. Arrange boxed and cased fruits, vegetables, and condiments in convenient stacks.

(e) Take an inventory of the food stock regularly and replenish or ration items as appropriate. Avoid excessive stockpiling.

(f) Date all supplies and place the oldest ones conveniently so that they may be used first.

(g) Check each newly opened package for signs of spoilage or infestation. If it is spoiled, destroy it promptly and thoroughly clean the space where it was stored in order to prevent contamination of other food. Bulging or badly rusted cans of food should be discarded.

(h) *Do not store brooms, brushes, mops, soaps, detergents, disinfectants, insecticides, paints, and other cleaning supplies and chemicals in the food storage or serving areas.*

(i) *Keep the food storage area free of rodents, pests, and insects by taking the following precautions:*

Keep the storeroom clean; screen or otherwise close all openings; promptly clean up anything that has been spilled on the floor or the shelves; dispose of refuse and garbage properly and promptly.

(j) *If the presence of rodents or pests is suspected, consult your local health officials and do not use rodenticides or insecticides except under the personal supervision of an authorized sanitarian.*

(2) *Refrigerated storage*

(a) Keep the refrigerator clean and free of odors.

(b) Empty and defrost the refrigerator once a week. Wash the shelves, containers, and trays with warm, sudsy water, then rinse and dry them. Wash the interior with a solution of baking soda and water, using 1 or 2 tablespoons of soda to each quart of water.

(c) Keep the temperature of the refrigerator between 30° F. and 40° F.

(d) Potentially hazardous foods such as perishable foods which consist in whole or in part of milk or milk products, eggs, meat, poultry, fish, shellfish, or other ingredients capable of supporting rapid and progressive growth of infectious or toxigenic microorganisms should be kept at 45° F. or below except during necessary periods of preparation.

(e) Do not open refrigerator doors unnecessarily.

(f) Use refrigerator space wisely but do not overcrowd. Air should circulate freely around the food items being stored.

(g) Use perishable, potentially hazardous foods such as ground meats, fresh liver, poultry, fish, shellfish, milk, and cheese within a day or two of purchase.

(h) Where facilities are available cool cooked foods quickly before storing. In the absence of such facilities these foods should be placed directly in the refrigerator. Use shallow containers with large surface area. It is safe to keep opened cans of food in the original containers if they are covered and refrigerated. Keep most foods covered.

(i) Do not refreeze frozen foods. Once thawed, use them as soon as possible.

(3) *Improvised storage and refrigeration*

(a) Improvised refrigeration facilities are, at best, poor substitutes for mechanical refrigeration and their use should be kept to a minimum.

(b) Give the same care in terms of use, cleanliness, and sanitation to insulated containers, desert coolers, underground or suspended food boxes, and other improvised cooling devices.

(c) Food that is stored in the open should be under improvised cover and insulation such as:

Roofing made of tarpaulins, canvas, boards, or roofing sheets supported by siding boards or sapling poles;

Insulated walls made by stacking bales of hay or straw.

Flooring made by racking planks, sapling poles, bricks, or other materials covered with straw or dry grass to keep food dry and off the ground. Good drainage may be provided by digging a ditch around the storage area.

Guides for Food Preparation and Service in Emergencies

a. *Timesavers in food preparation*

(1) Keep plenty of boiling water on hand, especially in outdoor feeding.

(2) Consult the menu and follow recipes.

(3) Know the number to be fed.

(4) Schedule time, so as not to prepare and cook food too far in advance of service.

(5) Assemble all equipment and ingredients and place at point of use. Use proper equipment for the job, if possible.

(6) Make every motion count. Avoid unnecessary reaching, bending, and stretching and accomplish something each time you pass from one part of the feeding area to another.

(7) Keep working areas cleared and uncluttered.

(8) Keep knives sharp.

(9) Don't attempt to chop or shred fruits and vegetables; cut in wedges or quarters for cooking; leave whole or cut in halves if serving raw.

(10) Cook root vegetables in skins whenever possible. If it is necessary to peel, a small, sharp paring knife peels faster than a larger one. Cut onions in quarters and slip skins off.

(11) To hasten heating time, preheat open cans of food before pouring into large containers.

(12) Whenever possible, use production line methods for quantity food preparation.

b. *Cooking for quality and palatability*

(1) Cook most cuts of meat, cheese, milk, and eggs at low temperature to improve flavor and decrease cooking losses.

(2) Cook vegetables and fruits just long enough to make them tender. If overcooked, they lose shape and become mushy.

(3) Vegetables and fruits that are to be served raw should be thoroughly washed in safe water.

(4) When making stew or a filling soup, the ingredients that take the longest time should be cooked first. Then add the others according to the length of cooking time required. Just before serving, add ingredients that need only heating or cooking at low temperatures, such as milk, butter, eggs, and canned vegetables.

(5) Barley, bread crumbs, cornmeal, rolled oats, flour, macaroni, rice, and tapioca are suitable thickeners and extenders for soup or stew. Mix thickener with liquid before adding to soup or stew.

(6) To cook macaroni, rice, or cereals add them to boiling, salted water, stirring constantly to prevent sticking.

(7) Break eggs separately into a small dish. If an egg is bad it can be discarded without spoiling the rest.

(8) Follow time and temperature requirements that vary with atmospheric pressure and altitude. Baking temperatures should be increased 2 to 3 degrees for each 1,000-foot increase of altitude.

c. *Use of quantity-tested recipes*

(1) For mass feeding, standardized quantity-tested recipes are recommended because they eliminate guess work and waste and assure consistently good products.

(2) Enlarging a family-sized recipe may very well produce disappointing results. Merely multiplying a small yield recipe to obtain a larger yield will alter the proportions, affect the method of preparation, the cooking time and the temperature.

(3) Therefore, if a family-size recipe must be used for a larger yield it is best to follow the original recipe but to make it up in several batches.

d. *Organizing the serving area and the work*

(1) See Figures 5 and 6 for suggested arrangement for serving food.

(2) If large group is to be fed, arrange several counters to permit more than one serving line.

(3) Decide where lines will form and how they will move to eating areas. Assign traffic directors to keep diners moving in orderly lines.

(4) Have sufficient personnel to serve and assign each worker a specific task or item to serve.

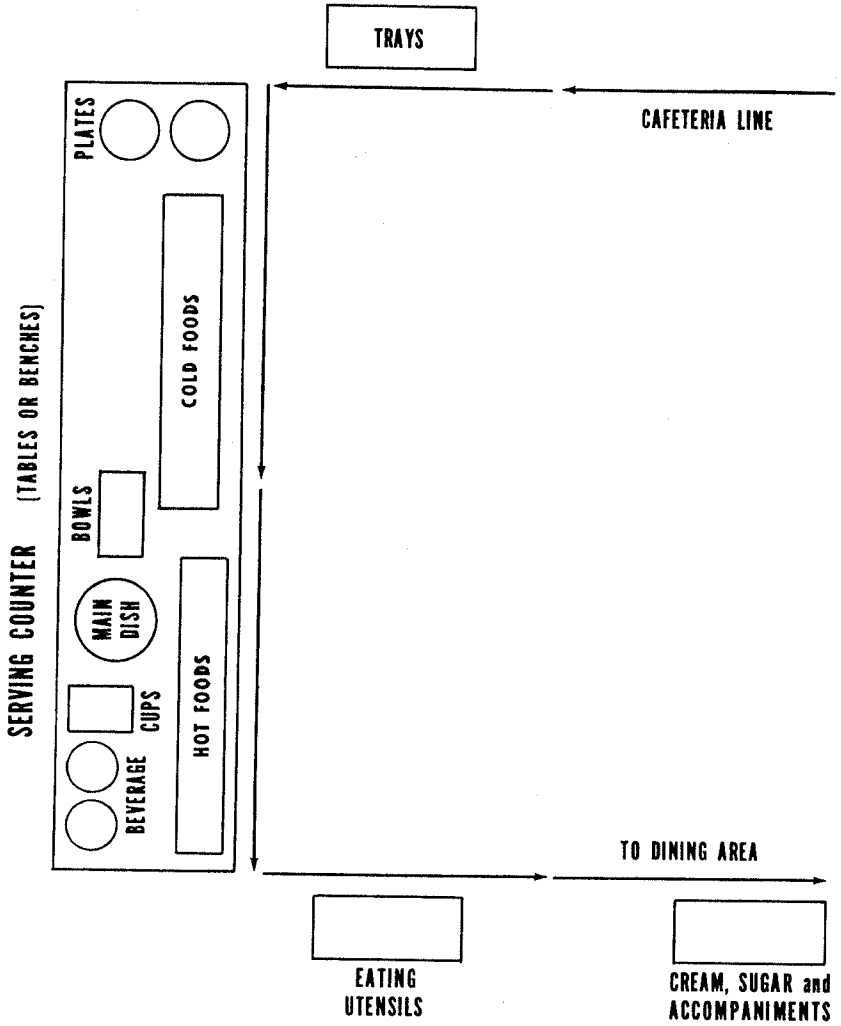


FIGURE 5.—Single-line cafeteria service.

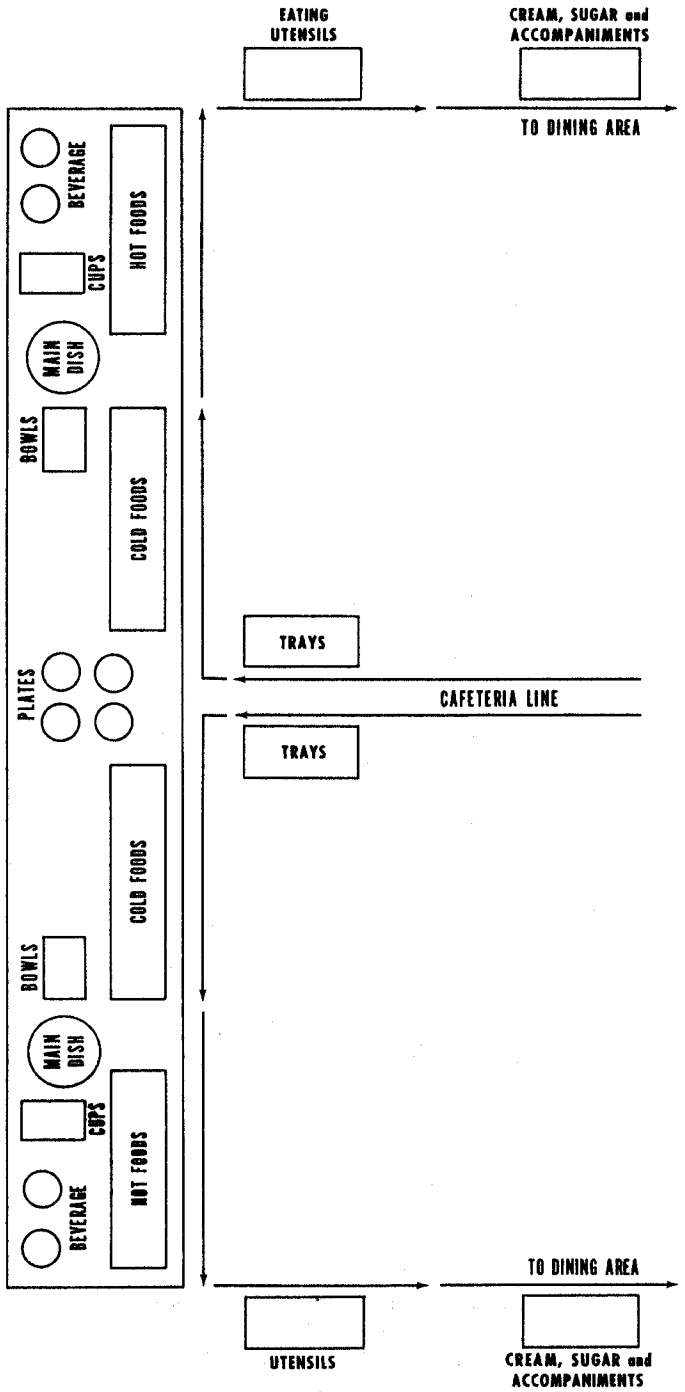


FIGURE 6.—Double-line cafeteria service.

(5) Count out paper plates, cups and eating utensils needed. Stack on serving counters at proper place. (If several eating utensils are provided, wrap in napkins for easy pickup.)
(6) Place trays (if used), napkins, and eating utensils at starting point. (If diners supply their own food containers, have a sanitizing facility near the beginning of the line.)
(7) Check menu to be sure nothing is missing.
(8) Do not dish up food and allow it to stand before service begins.
(9) Before serving starts, establish size of the portion for each food item. (A ladle or other container that holds the right amount of the food item makes portioning quicker and easier for the server).
(10) Avoid spilling and overfilling.

Guides to Care and Maintenance of Equipment

a. The large initial investment and the cost of repairs demand that good care be given to mechanically operated, institutional equipment. These factors of cost and care are critical in a period of disaster because of the possible unavailability of replacement parts and of trained repair personnel.

b. A few simple procedures may help keep heavy equipment in good operating condition and avoid breakdowns in an emergency period.

(1) *Motors and mechanized equipment*

Follow manufacturers' directions for the operation and care of motors and mechanized equipment.

(a) Learn how to operate equipment properly, such as electrical and mechanical appliances, pressure cookers, steam kettles, mixers, coffee urns, heaters, slicers, grills, ranges, and other kitchen equipment.
(b) Assign care of machines to a competent person, and make him responsible.
(c) Inspect machines daily for cleanliness.
(d) Post prominently any special warnings concerning care of equipment on or near the equipment.
(e) If instruction cards for operation are available, keep on or near each piece of equipment.
(f) Handle equipment with care when moving it.
(g) All equipment, whether borrowed or owned by the feeding groups, should receive the same inspection, care, and maintenance.

(h) Improvised utensils and equipment must be given special care to prevent rust and deterioration, especially if salvage materials are scarce.

(2) *Make needed repairs promptly*

(a) Lubricate moving parts frequently.
(b) Inspect and check equipment regularly.
(c) Assign repair of mechanically operated equipment to competent technicians, if possible.
(d) Replace worn or damaged electric cords as soon as wear or damage is apparent.

(3) *Keep the equipment clean by approved methods*

(a) After each use, thoroughly cleanse and sanitize all equipment. Disassemble large, stationary pieces of equipment, such as peelers, slicers, cutters, bench-type can openers, urns, grinders, sifters, and juice extractors so that all operating parts may be washed, rinsed, and sanitized. (See Dishwashing, page 79.)
(b) Defrost and clean refrigerators and ice boxes regularly.

(4) *Store equipment properly*

(a) Keep equipment in clean, dry, protected places. Improvise storage from empty packing cases or construct a small covered shed.
(b) Store containers, pots, and pans uncovered on their sides.
(c) Store all sanitized cooking and eating utensils and equipment in clean, dry places protected from flies, dust, or other contamination. Cups and glasses that are used and washed daily should be inverted on racks, clean shelves, or in closed cupboards. Cooking equipment in constant use may be suspended within easy reach.
(d) Store single-use utensils and other paper supplies in covered containers in which they are packaged.

c. *Care of commercial insulated containers*

(1) The commercial insulated container is the most commonly used piece of equipment for carrying hot foods from the place of preparation to the serving point. These containers are constructed on the principal of the thermos flask and are made of a metal alloy that is easily dented. The space between the inner and outer linings is packed with an insulated material that helps

retain the heat or cold of the contents. If either of these linings is punctured, the heat-and cold-retaining properties of the container are lost.

(2) Inspect containers frequently for signs of wear or damage to inner and outer casings, corrosion, loose-fitting lids, handles and clamps and worn gaskets. Repair promptly.

(3) Harsh abrasives, steel wool, pot scrapers, and knives will damage the container and should not be used for cleaning purposes. To remove food particles use a brush or a rubber scraper.

(4) Containers should *always* be thoroughly cleaned and sanitized before use!

(5) Directions for care.

(a) Before filling containers with food, rinse out with hot or cold water, depending on temperature of contents to be transported.

(b) Place food in the container as soon as possible after it is prepared.

(c) Fill containers to avoid loss of heat or cold.

(d) Place lid on container and clamp properly to insure a tight seal.

(e) Close temperature escape valve.

(f) Mark the container to show contents, time filled, and destination.

(g) Do not open container until ready to serve at destination.

(h) When transporting, secure containers firmly to avoid spilling.

(i) Handle containers carefully when loading and unloading as they are easily damaged.

(j) *Never place an insulated container on a hot stove, or near or over an open fire.*

(k) Immediately after use, empty contents, remove spigot (if any), wash container, lid, and spigot in hot water and detergent, rinse thoroughly and sanitize, replace spigot, and allow to air-dry.

(l) Store on rack in dry place, leaving lids *off*.

Control of Food Waste

a. The control of food waste in any feeding operation is an important index of the efficiency of management. Some food waste is to be expected. Wilted outer leaves, tough skins, rinds, cores and seeds, blemishes, bones, gristle and fat trimmings must be discarded for obvious reasons. Food

waste that is caused by careless handling and poor preparation and service is preventable.

b. Factors in the control of food waste include:

(1) *Planned procurement of food*

(a) Avoid buying or ordering too much.

(b) Plan the amounts to be procured, using the daily census and the portion size of serving as a guide.

(c) Prepare food orders that are clear and concise in terms of the amounts, sizes and retail or wholesale units desired.

(d) Check all food deliveries immediately on receipt, for quality and for weight or quantity.

(2) *Appropriate menus*

(a) Include foods that have popular appeal and are suitable for the group being fed.

(b) Avoid foods that may be out of season, difficult to obtain or too costly.

(c) Avoid foods that may be too complex or take too long to prepare.

(3) *Controlled food production and service*

(a) Avoid overproduction of food.

(b) Check any leftovers after each meal. Store leftovers properly and use within 24 hours.

(c) Use proper cooking methods, tested recipes and standard practices and equipment to prevent loss due to failures.

(d) Use portion controls to avoid plate waste.

(e) Check edible plate waste after each meal to determine and correct the causes for waste.

(4) *Preventing food losses*

(a) Keep food supplies under lock and key and issue them by requisition.

(b) Keep daily records of meals served, the amount of expected yield in relation to actual yield and the per capita cost of the food served. Such information provides a means of detecting "hidden" losses.

(c) Train and supervise all food service workers in waste prevention and control.

Food Requisition Guide

a. The following table may be used as a guide in requisitioning food for 100, 500, and 1,000 persons. Use of the table will prevent food waste, and facilitate menu planning and food preparation.

b. The term "as purchased" in the table means the weight of the item prior to removal of waste through boning, trimming, or other reduction.

FOOD REQUISITION GUIDE

Food items	Unit serving	Approximate amounts to requisition			Remarks
		100 servings	500 servings	1,000 servings	
Apples, eating	1 medium	1 box	4 boxes	8 boxes	1 lb. equals 3 to 5 apples 1 box equals 44 lbs.
Applesauce, fresh	½ cup	40 lb.	200 lb.	400 lb.	
Applesauce, canned	½ cup	5 No. 10 cans	22 No. 10 cans	44 No. 10 cans	6 No. 10 cans to a case
Apricots, dried	½ cup cooked	12½ lb.	62½ lb.	125 lb.	1 lb. package or 25-lb. box
Baking soda	As needed				Packed in ½ or 1-lb. packages in 6, 10, or 24-lb. cases
Bananas	1	30-34 lb.	150-170 lb.	300-340 lb.	1 lb. equals 2 to 4 bananas
Beans, dried lima	½ cup cooked	11 lb. (dry)	50 lb. (dry)	100 lb. (dry)	
Beans, dried navy	½ cup cooked	10 lb. (dry)	45 lb. (dry)	90 lb. (dry)	
Beans, string	½ cup cooked	24 lb.	120 lb.	240 lb.	1 lb. equals 3 cups cooked
Beans, string, canned	½ cup	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Beef, with bone	Allow ½ lb. per serving as purchased				
Beef, ground	¼ cup	20 lb.	100 lb.	200 lb.	
Beef for stew	3 oz. cooked	25 lb.	125 lb.	250 lb.	
Beef stew, canned	½ to ⅔ cup	5 No. 10 cans	25 No. 10 cans	50 No. 10 cans	
Beef stew and vegetables, canned	½ to ⅔ cup	5 No. 10 cans	25 No. 10 cans	50 No. 10 cans	
Beets, fresh	½ cup cooked	28 lb.	140 lb.	280 lb.	1 lb. equals 4 medium 1 bu. equals 52 lb.

FOOD REQUISITION GUIDE—*Continued*

Food items	Unit serving	Approximate amounts to requisition			Remarks
		100 servings	500 servings	1,000 servings	
Beets, canned	½ cup	5 No. 10 cans	25 No. 10 cans	50 No. 10 cans	
Bread, 1-lb. loaf	2 slices	13 loaves	63 loaves	125 loaves	1 loaf equals 16 slices
Bread, 2-lb. loaf	2 slices	8 loaves	38 loaves	72 loaves	1 loaf equals 28 slices
Butter and fortified margarine	1 large square	2-2½ lb.	10-11 lb.	24 lb.	32 1-lb. prints to case
Cabbage	½ cup cooked	25 lb.	125 lb.	250 lb.	
Cabbage, raw	½ cup shredded	16 lb.	80 lb.	160 lb.	50-lb. hamper equals 1½ bu.
Carrots, canned	½ cup	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Carrots, fresh	½ cup cooked	30 lb.	140 lb.	260 lb.	1 lb. equals 2 cups cooked
Carrots, raw	½ cup shredded	20 lb.	100 lb.	200 lb.	50-lb. equals 1 bu.
Cereal, granulated, farina type	½ cup cooked	4 24-oz. pkg.	20 24-oz. pkg.	40 24-oz. pkg.	
Cheese, American, cream	1 oz.	6¼ lb.	31½ lb.	62½ lb.	
Chili con carne	½ to ⅔ cup	5 No. 10 cans	25 No. 10 cans	50 No. 10 cans	
Cocoa	1 cup	1½ lb.	7½ lb.	15 lb.	
Coffee	1 cup	2 lb.	10 lb.	20 lb.	1 lb. coffee to 2½ gal. water
Coffee dehydrated	1 cup	1 8-oz. jar + 1-oz.	5 8-oz. + 1 2-oz. jars	5 16-oz. + 2 2-oz. jars	2 oz. coffee to ea. gal. of water
		4½ gal. water	21 gal. water	42 gal. water	
Corn, canned	½ cup	5 No. 10 cans	22 No. 10 cans	44 No. 10 cans	
Corned beef, canned	3 oz.	3⅓ 6-lb. tins	15 6-lb. tins	30 6-lb. tins	
Corned beef, hash	½ to ⅔ cup	5⅓ No. 10 cans	25 No. 10 cans	50 No. 10 cans	
Cornflakes	1 oz.	8-9 12-oz. pkg.	42 12-oz. pkg.	80 12-oz. pkg.	24 pkg. to case

FOOD REQUISITION GUIDE—*Continued*

Food items	Unit serving	Approximate amounts to requisition			Remarks
		100 servings	500 servings	1,000 servings	
Cornmeal, coarse	½ cup cooked	4 lb.	20 lb.	40 lb.	
Cornmeal, fine	½ cup cooked	3 lb.	15 lb.	30 lb.	
Crackers, graham	2	3½ lb.	17½ lb.	35 lb.	1 lb. equals 58 crackers
Crackers, soda	2	3 lb.	15 lb.	30 lb.	
Cream for beverage	1 oz.	3 qt.	15 qt.	30 qt.	
Eggs, fresh	1	8⅓ doz.	41⅔ oz.	83⅓ doz.	30 doz. to case
Eggs, dry whole	2 tbsp. plus 2½ tbsp. water equal 1 egg	3 lb.	15 lb.	30 lb.	4 cups dried equals 1 lb.
Fish, fresh filet	3 oz. cooked	33 lb.	165 lb.	330 lb.	
Fowl	¾ to 1 lb. as purchased	75 lb.	375 lb.	750 lb.	5 lb. average is best size to buy
Frankfurters	1 or 2	12½ lb. or 25 lb.	62½ lb. or 125 lb.	125 lb. or 250 lb.	Approximately 8 frankfurters to 1 lb.
Gelatin, dry, flavored	½ cup dessert	4 lb.	20 lb.	40 lb.	1 lb. equals 3½ cups
Grapefruit, fresh	½	1 crate (54s)	4⅔ crates (54s)	9¼ crates (54s)	54-80 count per crate
Grapefruit sections, canned	½ cup	4 No. 10 cans	19 No. 10 cans	36 No. 10 cans	
Grapefruit juice	4 oz.	4 No. 10 cans plus 1 No. 2	21 No. 10 cans	42 No. 10 cans	
Hams, smoked, bone in	3 oz. cooked	55 lb.	275 lb.	550 lb.	
Hominy grits	½ cup cooked	4 lb.	20 lb.	40 lb.	
Ice Cream, brick	⅛ qt.	12½ qt.	62½ qt.	125 qt.	Bricks can be purchased cut in 7 or 8 slices per qt.

FOOD REQUISITION GUIDE—*Continued*

Food items	Unit serving	Approximate amounts to requisition			Remarks
		100 servings	500 servings	1,000 servings	
Jams and jellies	1 tbsp.	6 1-lb. jars or ½ No. 10 can	2½ No. 10 cans	5 No. 10 cans	
Lettuce salad	1/6 med. head	1⅓ doz. (16 lb.)	6⅔ doz.	13 doz.	
Liver	3 oz. cooked	25 lb.	125 lb.	250 lb.	
Luncheon meat	2 oz.	13 lb.	65 lb.	130 lb.	
Macaroni	½ cup cooked	5 lb.	25 lb.	50 lb.	
Meat spread, deviled and potted	1½ tbsp.	13 No. ½ cans	65 No. ½ cans	130 No. ½ cans	
Milk, fresh	1 cup (½ pt.)	100 ½ pt. or 25 qt. or 2½ 10-qt. cans	500 ½ pt. or 125 qt. or 12 10-qt. cans	62½ gallons or 25 10-qt. cans	
Milk, evaporated	½ cup evap. milk plus ½ cup water	31 14½ oz. cans or 3¾ 8-lb. cans	134 14½ oz. cans or 18¾ 8-lb. cans	308 14½ oz. cans or 37½ 8-lb. cans	48 14½-oz. cans to a case
Milk, dried whole	2½ tbsp. (dry-½ oz.)	3½ lb.	15½ lb.	31 lb.	
Milk, dried skim	3 tbsp.	6¼ lb.	31¼ lb.	62½ lb.	
Molasses	2 tbsp.	3 qt.	15 qt.	30 qt.	10-lb. can equals 3 qt.
Noodles	½ cup cooked	6 lb.	30 lb.	60 lb.	
Onions, fresh	½ cup cooked	30 lb.	140 lb.	270 lb.	
Oranges	1	⅔ crate (176s)	3 crates (176s)	6 crates (176s)	176 count per case
Orange juice	4 oz.	4 No. 10 cans plus 1 No. 2 can	21 No. 10 cans	42 No. 10 cans	

FOOD REQUISITION GUIDE—*Continued*

Food items	Unit serving	Approximate amounts to requisition			Remarks
		100 servings	500 servings	1,000 servings	
Peaches, fresh	1 whole	25 lb.	125 lb.	250 lb.	4 med. peaches equal 1 lb.
	or				
	½ c. sliced	29 lb.	145 lb.	290 lb.	1 bu. equals 48 lb. approx.
Peaches, canned	2 halves	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Peanut butter	2 level tbsp. or 1 rounded tbsp.	7 lb.	35 lb.	70 lb.	
Pears, fresh	1	34 lb.	140 lb.	280 lb.	48–50 lbs. equal 1 bu.
Pears, canned	2 halves	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Peas, canned	½ cup	5 No. 10 cans	22 No. 10 cans	44 No. 10 cans	
Peas, dried	½ cup cooked	10 lb. (dry)	45 lb. (dry)	90 lb. (dry)	
Pineapple, canned	1 large or 2 small slices	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Pineapple juice	4 oz.	4 No. 10 cans & 1 No. 2 can	21 No. 10 cans	42 No. 10 cans	
Plums, canned	3 plums	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Pork loin for roasting	3 oz. cooked	Allow approximately ½ lb. per serving as purchased			
Potatoes	½ cup cooked	30 lb.	150 lb.	300 lb.	100 lb. per bag
	1 med. baked	37 lb.	185 lb.	370 lb.	60 lb. per bu.
Prunes, dried	4-5	12½ lb.	62½ lb.	125 lb.	Purchased in 1- or 2-lb. pkg. or 25-lb. boxes.
Puffed cereals	½ oz.	13 4-oz. pkg.	65 4-oz. pkg.	130 4-oz. pkg.	24 4-oz. pkg. to case
Rice	½ cup cooked	7 lb.	35 lb.	70 lb.	
Rolled oats	½ to ⅔ cup cooked	4 lb. or 6½ lb.	20 lb. or 31 lb.	40 lb. or 62 lb.	1 lb. equals 5½ cups uncooked

FOOD REQUISITION GUIDE—*Continued*

Food items	Unit serving	Approximate amounts to requisition			Remarks
		100 servings	500 servings	1,000 servings	
Salad dressing, cooked	1 tbsp.	2 qt.	10 qt.	20 qt.	
Salmon	½ cup	25 (1-lb.) tall cans	125 (1-lb.) tall cans	250 (1-lb.) tall cans	
Shredded wheat	1 biscuit	8 or 9 12-oz. pkg.	42 12-oz. pkg.	84 12-oz. pkg.	24 pkg. to case
Soup, condensed	½ cup soup plus ½ cup liquid	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Soup, dehydrated	1 cup	12½ lb.	62½ lb.	125 lb.	Directions on pkg. for preparing
Soup, ready-to-serve	1 cup	8 No. 10 cans	40 No. 10 cans	75 No. 10 cans	
Spaghetti	½ cup	5½ lb.	27½ lb.	55 lb.	
Spaghetti in sauce	½ to ⅔ cup	5 No. 10 cans	25 No. 10 cans	50 No. 10 cans	
Spinach	½ cup cooked	34 lb.	170 lb.	340 lb.	18 lb. to bu.
Squash, summer	½ cup cooked	30 lb.	150 lb.	300 lb.	Approx. 40 lb. to bu.
Squash, winter	½ cup cooked	50 lb.	250 lb.	500 lb.	
Sugar, granulated	2 tbsp.	6 lb.	38 lb.	60 lb.	
Tapioca	½ cup cooked	2 lb.	10 lb.	20 lb.	
Tea	1 cup	⅓ lb.	1⅔ lb.	3⅓ lb.	1 lb. equals 6 cups (dry)
Tomato juice	4 oz.	4 No. 10 cans plus 1 12-oz. can	21 No. 10 cans	42 No. 10 cans	
Tomatoes, fresh	1 medium whole	25 lb.	125 lb.	250 lb.	Slightly less for sliced tomatoes
Tomatoes, canned	½ cup	5 No. 10 cans	22 No. 10 cans	44 No. 10 cans	
Tuna fish	½ cup	25 No. 1 cans	125 No. 1 cans	250 No. 1 cans	
Turnip greens	½ cup cooked	37 lb.	175 lb.	340 lb.	
Turnip greens, canned	½ cup heated	5 No. 10 cans	22 No. 10 cans	44 No. 10 cans	

PREPARING SANDWICHES IN AN EMERGENCY

1. Sandwiches can be the hearty, meal-in-one types that are served as a main dish or the more simple types that are served as an accompaniment to a main dish.

2. The variety of sandwich ingredients and fillings is so great that almost any food can be used.

3. A large number of sandwiches can be prepared in a very short time by using one of several efficient production-line methods. In an emergency a dozen workers can make from 10 to 15 regular sandwiches a minute (600 to 900 an hour). Experienced workers can make more.

4. Sandwiches are perishable because they are highly susceptible to contamination and spoilage. The purpose of the public health regulations on sandwich making is to insure that they will be properly handled, prepared, stored, refrigerated, transported and served. It is important to have these sanitation regulations and approved measures strictly observed when sandwiches are being made by a production-line method. It is even more important when they are being made under disaster emergency conditions.

Efficient Work Setup

a. Arrange materials within easy reach. Tilt filling containers slightly.

b. If possible, adjust working surfaces to proper heights for comfort. Tired backs and aching feet reduce output.

c. Clean work surfaces "as you go," using only soap or detergents as cleansing agents.

d. Place "in use" bread supply at left of worker in method No. 1, and in front of worker in method No. 2, as described on pages 123 and 124.

Tools Needed:

a. A spatula or spreader, with blade long enough to reach across a slice of bread

b. Portion scoops

c. Knives for slicing or dicing

d. Forks for picking up slices

e. Can openers

f. Spoons

g. Containers for dry bread and waste

h. Trays

Bread Tray Setup

a. Use ready-sliced bread for speedy production and uniformity.

b. Leave wrappers on until ready to use the bread.

c. Open wrapper by slitting through middle of loaf with knife.

d. Place bread on tray, each half-loaf open side down, 6-half loaves on tray.

e. Remove wrapper from a half-loaf at a time.

f. Place bread heels in container for dry bread.

Preparation of Fillings

a. Cream butter or margarine in advance. Avoid use of melted butter because it soaks into the bread. Creamed butter or margarine forms a protective coating and doesn't soak in.

b. To save time and labor, use easy-to-spread fillings or sliced ingredients, such as cheese or meat.

c. Cross-stack sliced ingredients for easy pickup.

d. Add ingredients, such as pickles, relish, vinegar, lemon juice, olives, catsup, or chili sauce to cheese, meat, egg, poultry, and bean fillings. The acid in these ingredients improves keeping qualities.

Handling of Sandwiches

a. Handle bread and fillings as little as possible.

b. Don't use hands if equipment or tools can do the job.

c. Refrigerate fillings, if possible.

d. Keep only a working supply of sandwich materials at the counter; replenish as needed.

e. Prepare fillings only in quantities that can be used during one serving period.

f. Label sandwiches in groups to show kind of filling, date, and hour made. (This information will enable a determination of the time beyond which the sandwich should not be served.)

Cleanliness of Workers

(The rules of "Guidelines to Personal Hygiene" shown in Section 3 on page 75 of this handbook must be strictly observed.)

Sandwich Supplies

Bread	**Allow 2 slices per serving. Number and thickness of slices in a loaf will vary among different localities. Slices from a 3-pound loaf are larger in surface area than slices from a 2-pound loaf.**

Loaf yields (without end crusts)

Kind	*Pounds weight*	*Number slices*	*Slice thickness (inch)*
White, regular	1¼	19	⅝
	1½	24	⅝
White, sandwich	2	28	½
	2	36	⅜
	3	44	½
	3	56	⅜
Whole wheat	1	16	⅝
	2	28	½
	3	44	½
	3	56	⅜
Rye	1	23	¾
	2	33	¾

Buns	Allow 1 sandwich bun per serving
Butter	1 lb. softened butter, at 1 tsp. per slice, will spread 96 slices of bread
Bacon	1 lb. averages 25 medium strips, or 1½ cups cooked and chopped
Cheese	
Sliced	1 lb. averages 16 slices (1 oz. each)
Cottage	1 lb. averages 1 pt.
Cream	1 lb. averages 1 pt.
Processed, grated	1 lb. averages 1 qt.
Celery	1 lb. averages 1 qt. chopped
Chicken	5-lb. fowl averages 1 qt. cooked and diced meat
Sliced	1 lb. averages 12 slices (1½ oz. each) or 16 slices (1 oz. each)
Eggs	Hard cooked 1 doz. averages 3½ cups chopped
Jelly (or preserves)	1 pt. will spread 16 sandwiches
Lettuce	1 medium head averages 16 leaves
Margarine	1 lb. softened margarine, at 1 tsp. per slice, will spread 96 slices of bread
Mayonnaise	1 pt. mayonnaise, at 1 tsp. per slice will spread 50 slices of bread
Meat	
Sliced	1 lb. averages 8 slices (2 oz. each)
Ground, raw	1 lb. averages 1 pt.
Ground, cooked	1 lb. averages 3 cups
Nut Meats	1 lb. averages 3¾ cups chopped
Onions	1 lb. averages 1 pt. chopped
Olives (drained)	1 qt. averages 3 cups chopped
Pickles (drained)	1 qt. averages 3 cups chopped
Peanut Butter	1 lb. averages 1¾ cups
Salmon	1 lb. averages 1 pt. flaked
Sandwich Filling	3 qt., at one scoop (No. 20) per sandwich, will spread 60 sandwiches
Tuna Fish	1 lb. averages 1 pt. flaked
Tomatoes	1 lb. averages 3 or 4 medium-size tomatoes

Production Line Sandwich Making

Sandwiches can be prepared quickly by using production line methods. In disaster operations, sandwiches may be left whole to save time in production and for easier eating.

a. *Method No. 1 (requires 2 or more workers)*

Materials needed:

(a) Sandwich fillings
(b) Butter or margarine
(c) Bread tray setup
(d) Cut waxed paper or cellophane for wrapping
(e) Spreaders, scoops, and knives at proper places

Duties of worker No. 1.

What to do	How to do it
Place 2 matching slices of bread on board.	Use left hand. Place slices of bread in rows with matching slices alongside.
Spread softened butter or margarine on bread slices.	Use right hand. Use spreader. Spread to edges of bread.
Place fillings on buttered bread.	Use right hand. Transfer sandwich-filling portions with scoop or spreader on alternate rows of bread in 1 operation. (If filling is sliced, such as cheese, tomato, or meat, transfer with fork.) Make 1 stroke of the spreader away from you and 1 stroke toward you to spread the filling evenly to the edges of the bread slice.
Close sandwiches.	Use left hand. Turn corresponding slice of bread over filling of each sandwich, matching edges of the bread.
Transfer sandwich to paper on your right.	Use both hands. Transfer completed sandwich to wrapping paper by sliding knife under the sandwich and supporting it with other hand. Center the sandwich so that top and bottom crusts are parallel to long sides of paper.

Duties of worker No. 2 (to right of worker No. 1)

What to do	How to do it
Place oblong pieces of cut paper for wrapping to right of worker No. 1. Arrange trays to right of worker No. 2.	Place 1 sheet to right of worker No. 1. Short side of the paper parallel to edge of the table. Use both hands.
Wrap uncut sandwiches, using a pharmacy fold. (See Fig. 7, and directions page 126).	Bring the two short sides of the paper together above the sandwich, fold them over once or twice in a narrow flap, then flatten paper against the bread. Turn both ends of the top fold down and tuck them firmly under the bottom slice of bread. Tuck the bottom part of the paper neatly and tightly under the bottom slice of bread.
Label sandwiches in groups—showing time, date, and hour made. (An extra person may be used for this duty and to store the sandwiches in refrigerator.)	Use gummed labels, if available.
Stack wrapped sandwiches.	Use right hand. Stack sandwiches 6-high on trays. Do not stack in cardboard boxes for storage. The cardboard is an insulator that prevents sandwiches in the middle of the boxes from reaching low temperature quickly. Store filled trays in refrigerators, if available. Maximum safe storage time is 12 hours.

b. *Method No. 2 (requires 5 or more workers)*

(1) Organization of production lines.

(a) Single line—requires 5 to 7 workers on one side of a table. See chart on page 125.

(b) Double line—requires 10 or more workers, using both sides of the table.

(A double production line may be formed by adding 4 or 5 more workers to form a matching line on the opposite side of the table. The worker at No. 1 position is placed at the head of the table, facing both lines. This person slides the bread alternately to the No. 2 workers on either side of table. The No. 6 or 7 worker is placed at the foot of the table to collect, stack, and label the wrapped sandwiches from both sides of the line.)

(2) Materials needed.

(a) Have sandwich filling, butter or other spread, bread, waxed paper, and spreaders ready at the proper places in front of the workers.

(3) Procedure for making sandwiches.

(a) Form a single production line by assigning 5 to 7 persons along one side of a table.

Worker No. 1 cuts the paper into oblong pieces of single-sandwich size. Arranges cut paper with short side toward worker, places two matching slices of bread side by side on the paper and slides along to—

No. 2, who, with two strokes, spreads one slice of bread with butter or margarine and slides the paper on to—

No. 3, who puts a scoop of filling or lays slices of fillings on one slice of bread and slides the paper on to—

No. 4, who spreads filling or places relish on a slice of filling and slides paper on to—

No. 5, who puts the two slices of bread together, and slides paper on to—

No. 6, who wraps the sandwich and slides it along to—

No. 7, who labels and stacks sandwiches in basket, if they are to be sent out immediately. If they are to be stored, they are stacked 6-high on trays and placed under refrigeration.

Single production line for sandwich-making, showing positions and duties of workers, and work flow.

Position 1	Position 2	Position 3	Position 4	Position 5	Position 6	Position 7
Cuts paper and places bread	Spreads butter	Places filling	Spreads filling	Puts slices together	Wraps sandwich	Labels, stacks, and stores

c. *How to wrap sandwiches, using a pharmacy fold*

(1) Center a sandwich on an oblong piece of wax paper. The short sides of the paper should be parallel to the edge of the table.

(2) Bring the two short sides of paper together above the sandwich, fold them over once or twice in a narrow flap, and then flatten the paper against the bread.

(3) Turn both ends of the top fold down and tuck them firmly under the bottom slice of bread.

(4) Tuck the bottom part of the paper neatly and tightly under the bottom slice of bread.

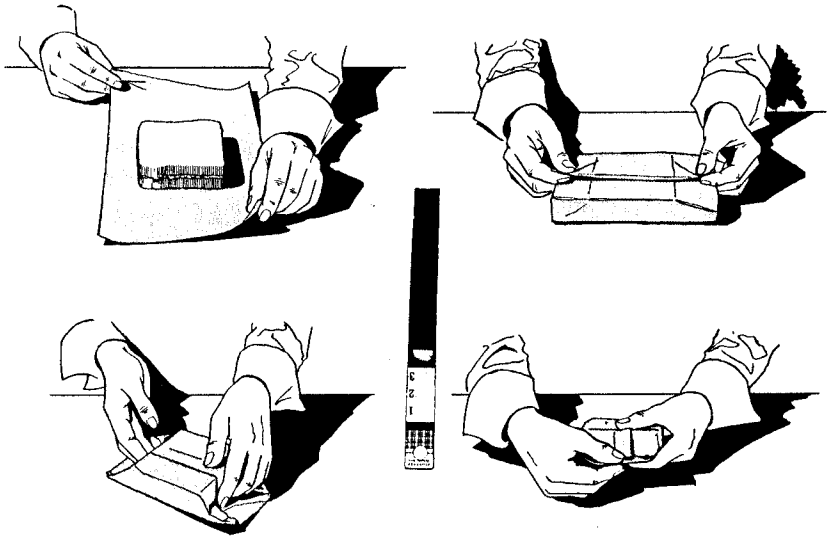


FIGURE 7.—Pharmacy fold.

Improvising in Emergencies

Improvised Cooking Vessels (See Figure 8)

a. 55-gallon drum

(1) Construct by cutting the drum in half.

(2) Both ends of drum may be used if end with opening is plugged to prevent leakage.

(3) Drums must be thoroughly cleansed, scoured, and sanitized before use. (See cleansing directions in Sec. 3, p. 80 this handbook).

(4) Number needed is 2 half-sections per 100 diners.

b. Pail or bucket

(1) Enamel or stainless-steel pails or buckets may be used for cooking.

(2) Do not use galvanized pails or buckets.

(3) Pails or buckets must be thoroughly cleansed and sanitized before use.

(4) Number needed is 4 per 100 diners.

c. Lard can

(1) A 37-pound lard or shortening can, or a lard can of similar size, can be used as a cooking container by removing one end and attaching a handle of baling or other wire.

(2) Number needed is 2 per 100 diners.

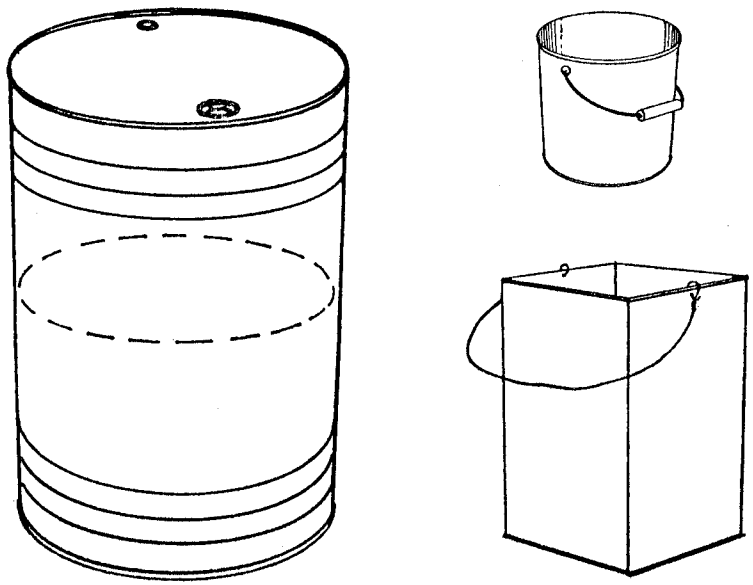


FIGURE 8.—Improvised cooking vessels.

Improvised Hot Food Containers

a. Materials needed (See Figure 9).

(1) One large can, such as a 37-pound lard tin or a 5 or 6-gallon food container.

(2) Plywood or similar material for constructing a covered box 1 inch wider and 1 inch deeper than the container.

(3) Sand for insulation.

b. Procedure
   (1) Heat sand.
   (2) Place 1 inch of hot sand in the bottom of the box.
   (3) Put preheated empty food container inside box. Cover to keep food container clean while filling box with sand.
   (4) Fill space between sides of container and box with hot sand.
   (5) Fill container with hot food.
   (6) Cover box with lid.

c. Use
   (1) This improvised container may be used to transport hot food. If carried long distances, box should be covered entirely with heavy wrapping—blanket, tarpaulin, canvas, or several thicknesses of newspaper—to retain the heat.

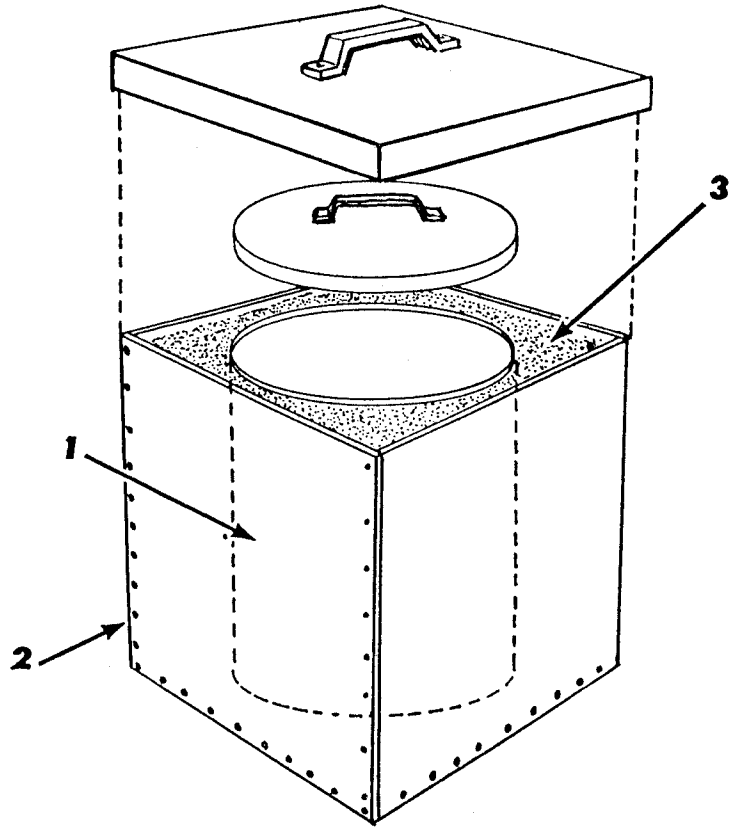


FIGURE 9.—Improvised hot food container.
(1. Can. 2. Box and cover. 3. Sand.)

d. Number needed
   (1) Hot beverages—2 per 100 diners.
   (2) Solid food—3 per 100 diners.

Improvised Refrigeration—Evaporation Cooler

a. Materials needed (See Figure 10)
   (1) Orange crate or box
   (2) Burlap or cheesecloth to cover
   (3) Pan of water
   (4) Stone or other weight

b. Procedure
   (1) Remove two sides of box or crate.
   (2) Place pan of water on top of crate.

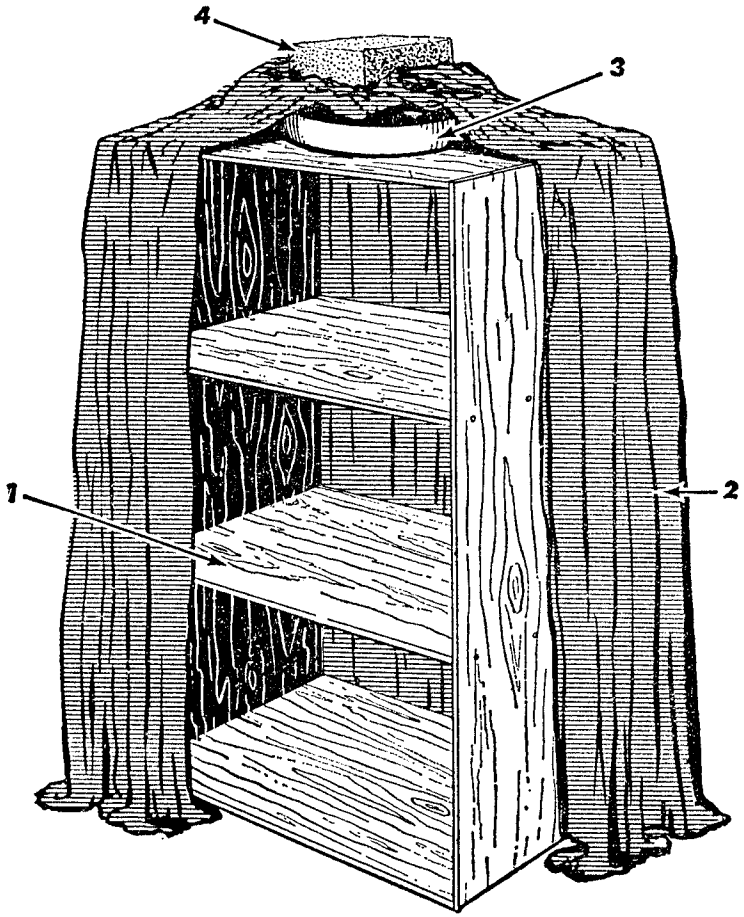


FIGURE 10.—Evaporation cooler.
(1. Crate or box. 2. Covering. 3. Water pan. 4. Weight.)

(3) Gather material at the top and lay bunched end in a pan of water. Place stone on the material to hold it securely. Drape rest of the material around the box, leaving a small opening.
(4) Cooler may be suspended to protect against insects and animals.

Barrel or Range Can (for icing foods and keeping foods hot)

a. Materials needed (See Figure 11)
(1) Can or barrel (with cover) larger than the food container.
(2) Food container (with cover)
(3) Ice for cooling food or shredded newspaper or excelsior as insulation for keeping food hot.

b. Procedure for icing food.
(1) Place food in the sanitized container. If food is hot, cover or otherwise protect the food product while cooling.
(2) Place lid securely on the container.
(3) Place food container into the barrel or can.
(4) Pack can solidly with ice to near top of food container (do not cover top of container).
(5) Place cover on the barrel.

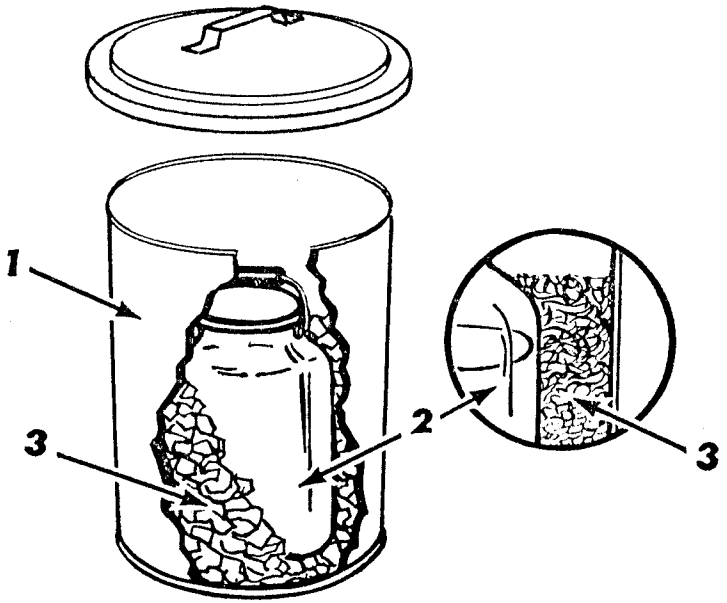


FIGURE 11.—Barrel or range can.
(1. Can with cover. 2. Food container. 3. Ice or insulation.)

c. Procedure for keeping food hot.
(1) Place hot food in container and cover immediately.
(2) Drop food container in the barrel or can.
(3) Pack the can tightly with dampened shredded newspaper or excelsior.
(4) Place cover on the barrel.

Liquefied Petroleum Gas (Bottled Gas) in an Emergency

a. If gas mains are destroyed or gas service is disrupted, the availability of bottled liquefied petroleum (LP gas) would permit full utilization of most of the available gas-burning kitchen facilities. LP gas is good emergency fuel. Practically all cooking and heating equipment that burns natural or manufactured gas can be converted to burn LP gas. Because it is stored in self-contained cylinders of varying sizes—some small enough to be carried by hand—it is readily transportable to meet disaster needs.

b. *For cooking, water heating, refrigeration, sterilization, and space heating*
(1) Any range or other equipment, large or small, that burns natural or manufactured gas can be quickly converted to use bottled gas by the installation of a simple adaptor and proper connections from the cylinder to the gas-burning equipment. For safety, only qualified technicians should make the conversions.
(2) For mobile feeding, cylinders of bottled gas may be mounted on any improvised or commercial kitchen vehicle, along with gas appliances and other kitchen gear necessary to heat water and prepare and serve food.
(3) Gas ranges salvaged from damaged homes or institutions can be converted for use to LP gas in outdoor operations. Those in undamaged homes or institutions can also be made operable on site.
(4) Table-type gas burners, counter grills, and griddles may also be converted for emergency cooking with LP gas. When used with a camp-style ground utility stove, LP gas provides a hot flame for heating large containers of water, stew, soup, and coffee.

c. *For lighting*
Portable reflector floodlights fueled from cylinders of LP gas are available in weatherproof, self-contained units. They provide excellent lighting and have the same portable fuel features as LP gas for cooking.

d. *For incineration*

An LP gas-fired hand weed burner provides an intensely hot flame. It can be put to many other good uses in outdoor feeding, some of which are for quickly starting wood, coal, or charcoal fires, as well as for incineration.

e. *For power*

Internal combustion engines can be adapted to operate on LP gas to provide a source of power for pumping, for refrigeration, and for transportation.

f. *Where LP gas may be used*

(1) Restaurants, cafeterias, clubs, and diners.

(2) Hotels, motels, hospitals, and institutions.

(3) Feeding stations, auxiliary kitchens, mobile kitchens, canteens, outdoor feeding centers, shelters and other emergency welfare centers.

(4) Homes

Improvising Emergency Measuring Utensils from Tin Cans

a. When regular measuring utensils are unavailable, fairly accurate measuring can be accomplished by improvising utensils from emptied tin cans. After being prepared, the improvised utensils should be sanitized and marked with adhesive tape or paint for easy identification.

b. *Directions for making small measures.*

(1) ¾ cup from No. 1 can.

Cut down each side of seam (strip should be 1 inch wide) to within two and one-half (2½) inches of the bottom.

Cut from seam of can around to other side of seam; after removing sharp edges to prevent injury bend seam over to make a handle.

(2) A 6-ounce concentrated fruit juice can equals ¾ cup.

(3) An 8-ounce can equals 1 cup.

(4) 1½ cups from a No. 2 can. (Follow directions under (1) above.)

(5) 2 cups from a No. 2½ can.

Cut to within 2¾ inches of the bottom of the can; make handle as above.

c. *Directions for making large measures*

(1) Use tin cans as follows:

Size of can	*Approximate equivalent measure*
No. 303 cylinder	15 ounces or 2 cups
No. 2 can	18 ounces or 1 pint and 2 ounces or 2½ cups
No. 2½ can	26 ounces or 1 pint and 10 ounces or 3½ cups
No. 3 cylinder	46 ounces or 1 quart 14 ounces or 5¾ cups
No. 10 can	96 ounces or 3 quarts or 12 cups

(2) To permit portion control, a wooden handle of the desired length may be nailed to the seam of the measure for use as a serving dipper or ladle. This handle may be a broom handle, or a 1-inch thick piece of tree limb, or board cut to desired size.

Improvising Outdoor Facilities

a. *Open fire cooking and heating units*

(1) Materials needed (See Figure 12)

Twelve (12) bricks, flat stones, or (4) cinder or concrete blocks

Half of a 55-gallon drum or other large container for cooking

Upper half of drum or piece of sheet metal of similar size can be used as a shield

(2) Procedure

Outline a square large enough to accommodate the cooking container.

At center of each of four sides of square, stack three bricks so that they will support the container. Stack bricks so that edge of container will center on each stack.

Place pot on stack of bricks.

Bend sheet metal to fit around stacks of bricks.

Leave about a 6-inch space between ends of sheet metal.

(3) Operation

Build wood or coal fire at center of stacks of bricks. Place 6-inch opening of shield so that it faces the wind.

Move shield as required for draft and refueling.

(4) Use for cooking and water heating.

(5) Number needed

Two per 100 diners.

Six per 500 diners.

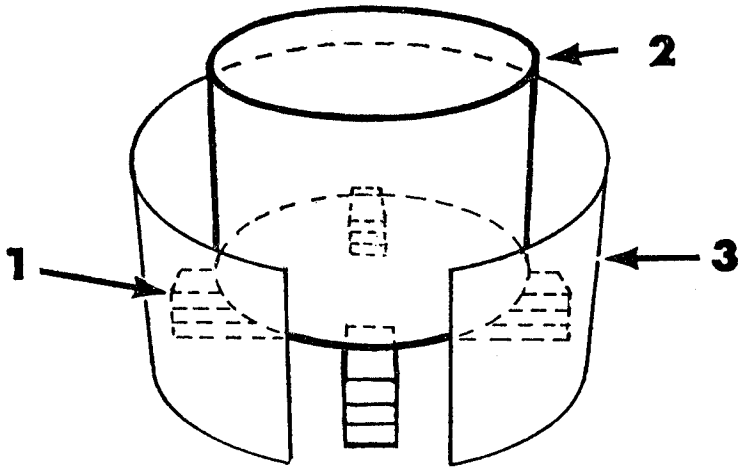


FIGURE 12.—Open-fire cooking and heating unit.
(1. Bricks. 2. Oil drum. 3. Shield.)

b. *Crossfire trench*

(1) Materials needed (See Figure 13)

Three pieces of sheet metal 1½ by 1 foot to regulate draft.

Approximately 10 pieces of scrap iron 2 feet long for grate (such as pipe, angle iron, or ½-inch round iron).

(2) Procedure

Dig 2 trenches, each 8 feet long, 1 foot wide, and 1 foot deep, crossing at their centers.

The ends of each trench should taper to the level of the ground.

Place scrap iron over the intersection of the trenches to make a grate.

(3) Operation

Build coal or wood fire at intersection of trench.

Use the three (3) pieces of sheet metal to block off 3 of the 4 sides of the trenches. Leave open side facing direction of the wind.

(4) Use for cooking and incinerating.

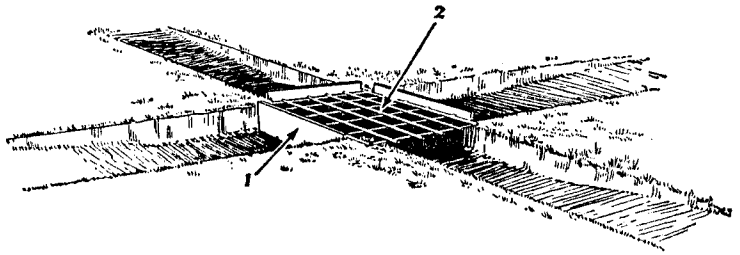


FIGURE 13.—Crossfire trench.
(1. Sheet metal. 2. Grate.)

(5) Number needed

Two per 100 diners.

Six per 500 diners.

c. *Crossfire trench—above ground*

(1) Materials needed (See Figure 14)

Approximately one hundred (100) bricks.

Approximately 10 pieces of scrap iron for grate (such as pipe, angle iron, or ½-inch round iron).

Two pieces of sheet metal to act as support for the grate.

(2) Procedure

Lay four parallel rows of brick in a cross, so that they intersect at their centers to form a firebox.

Allow one foot of space between rows.

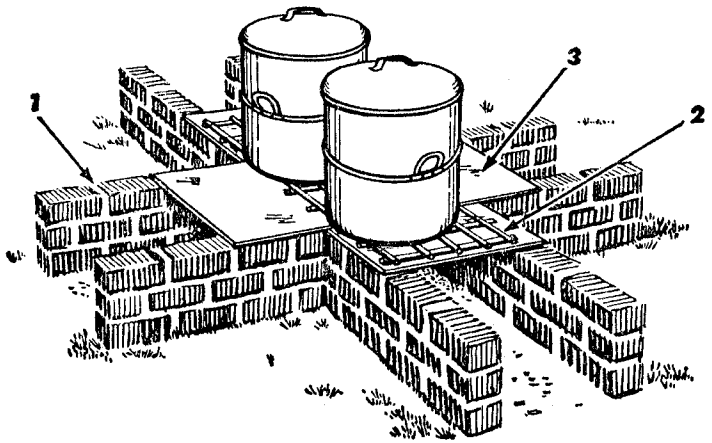


FIGURE 14.—Crossfire trench—above ground.
(1. Bricks. 2. Grate. 3. Sheet metal.)

Form sidewalls by stacking bricks three-high with mortar in between.

Lay sheet metal at intersection.

Place scrap iron over the sheet metal to make a grate.

d. *Handwashing facility*

(1) Materials needed (See Figure 15)

Two No. 10 tin cans or other metal containers for water, with bails and tilt handles.

One length of iron rod or pipe, or wood to suspend cans.

Six lengths of wood to form tripods, with cord or wire for tying.

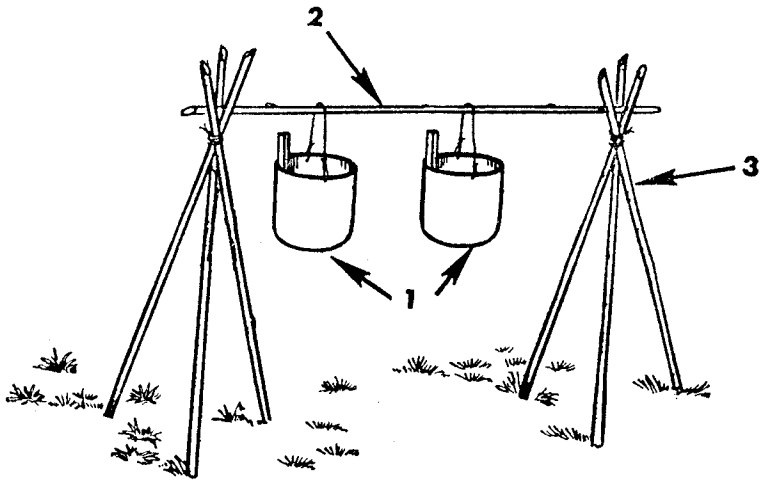


FIGURE 15.—Handwashing facility.
(1. Cans. 2. Rod. 3. Tripod.)

(2) Procedure

Erect tripods.

Put bails and tilt handles on cans.

Suspend cans on pole, tie to pole, and place pole on tripods.

Fill area below cans with sand or gravel to drain water.

(3) Use

Fill one (1) container with soapy water.

Fill other can with disinfecting solution (1 ounce of any ordinary household liquid bleach to 2 gallons of water.)

Provide single-service paper towels for each person.

Provide trash can for towel disposal.

e. *Emergency dishwashing facility*

(1) Materials needed (See Figure 16)

Three large cans.

Length of tin or sheet metal for shield.

Round iron or sheet metal for can supports.

(2) Procedure

Dig a trench about 10 to 12 feet long, 1 foot wide, and 1 foot deep.

One end of the trench should taper to the level of the ground.

Place round iron or sheet-metal supports if needed.

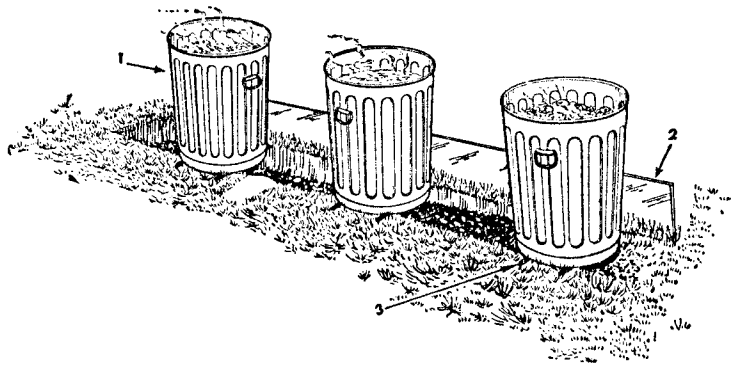


FIGURE 16.—Emergency dishwashing facility.
(1. Cans. 2. Shield. 3. Supports.)

Place length of sheet metal along one side of trench as shield against burns from the open fire.

(3) Operation

Build coal or wood fire the full length of the trench.

Use one can as soapy wash water container, one as hot rinse water container, and one as sanitizing water container.

Hot coals should be spread so as to maintain the hottest fire under the sanitizing container.

f. *Ground griddle*

(1) Materials needed (See Figure 17)

Two pieces of steel plate at least 30 by 30 inches, approximately ¼-inch thick. If only one piece of steel plate is available, it may be used.

One piece of stovepipe or several No. 10 tin cans with both ends cut out.

Two lengths of pipe or round iron to support the steel plate.

Sand or dirt to put between pieces of steel plate to prevent plate buckling from overheating.

(2) Procedure

Dig fire pit about 2 feet square and 1 foot deep.

One end should slope to the level of the ground.

Place lengths of pipe across the fire pit as support for steel plate.

Place one steel plate over fire pit.

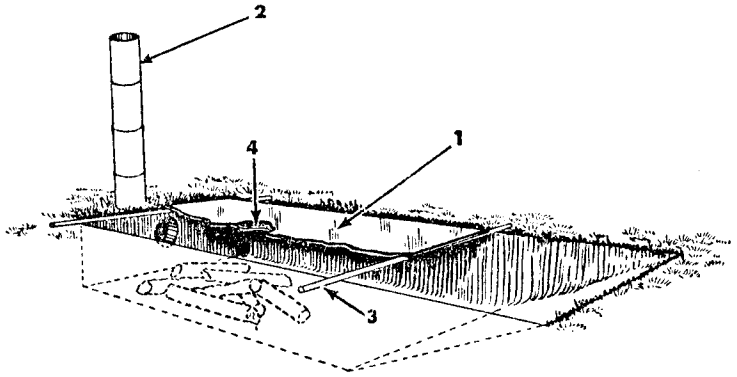


FIGURE 17.—Ground griddle.
(1. Steel plate. 2. Pipe or cans. 3. Plate supports. 4. Sand or dirt.)

Cover steel plate with 1 inch of sand or dirt. Place second steel plate on top of sand or dirt. Directly behind and at center of the deep end of the fire pit, dig a hole 6 inches square and 6 inches deep so that hole opens into the pit to make a chimney.

Place No. 10 cans one on top of the other to fit over hole in ground to form the chimney stack. A tighter chimney may be made by cutting several inch-wide sections around the bottom edge of each can so that it fits over the rim of the connecting can.

Bricks may be used to hold the chimney in place.

(3) Use

This facility may be used as a griddle, a quick-bread oven using a tin can to cover dough, or as a food warmer.

(4) Number needed

Two per 100 diners.

Six per 500 diners.

g. *Improvised roaster*

(1) Materials needed (See Figure 18)

One large can with tight-fitting cover.

(Preferably institutional-size lard or shortening can)

Bricks, cinderblock, or stones to construct sidewalls of a fire pit.

Length of steel rod, round iron, or heavy wire to be used as a spit.

Length of fine strong wire to tie the meat to the spit.

(2) Operation

Build fire around inside of brick fire pit, allowing space in center for cooking container to rest on ground.

Punch a hole for spit on each side of the can several inches below the rim.

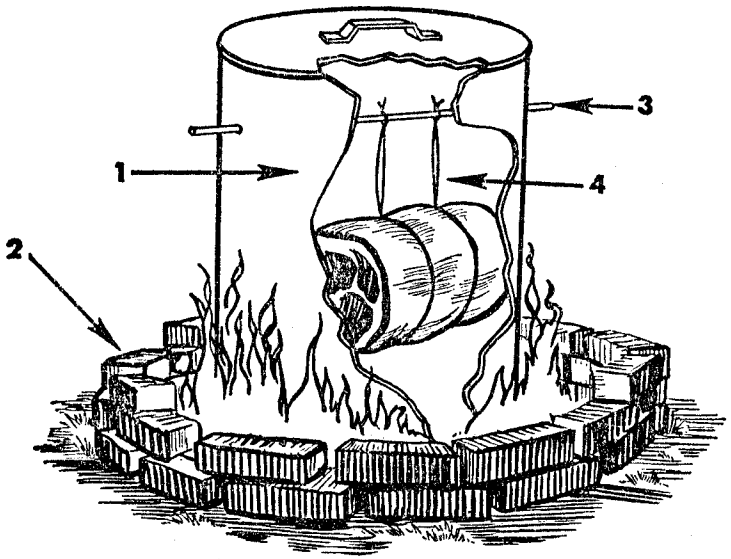


FIGURE 18.—Improvised roaster.
(1. Can with cover. 2. Bricks. 3. Rod. 4. Wire.)

Wrap fine wire around roast several times (or run wire through the center of the meat), leaving ends long enough to make a strong loop.

Run spit through one hole, then slip wire loops over the spit so that meat hangs suspended in the can.

Run spit through the other hole. (Do not put water in the container. Meat should cook in its own steam.)

Place the cover on the can.

Place container on ground within fire pit and put weight on cover to hold it securely.

Remember that meat cooks more quickly in this type of pressurized container. For example, a 20- to 25-pound chunk of roast beef will cook in 2 to 2½ hours.

h. *Soakage pit*

(1) Materials needed (See Figure 19)

Cover made of two 1-inch layers of wood, with lower layer of wood recessed to fit top of box, or constructed otherwise for tight fit.

Reinforcing strips of approximately 1 by 4-inch lumber to brace top of box.

Lumber for box, approximately 12 inches square and 2 feet high, open at both ends.

Layer of wire screen matting, gunny sacking, tar paper, or heavy layer of newspapers to retain earth mound above rocks.

Rocks or rubble to fill pit 5 feet in diameter and 5 feet deep.

Wire basket of approximately ¼-inch mesh hardware cloth resting on 1 x 4-inch wood inner strips.

Earth mound approximately 6 inches high at center point.

(2) Procedure

Locate in well-drained ground suitable for good soakage, preferably sand or gravel soil.

Dig pit.

Fill pit with rocks or rubble to within 1 foot of ground surface.

Insert box as shown in Figure 19.

Add enough rubble to fill pit to ground surface around box.

Cover rubble with screen wire or any other material that will serve as a separator between rubble and earth topping.

Mound dirt over pit.

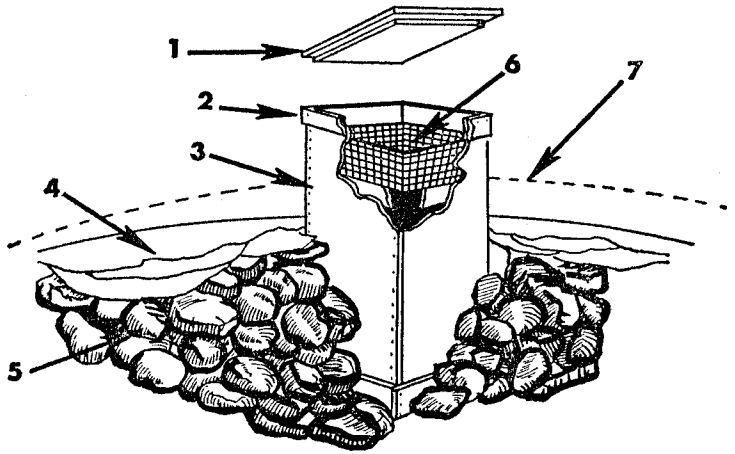


FIGURE 19.—Soakage pit.
(1. Box cover. 2. Reinforcing strips. 3. Box. 4. Rock cover. 5. Rocks or rubble. 6. Basket. 7. Earth mound.)

i. *Outdoor pit latrine*

(1) Materials needed (See Figure 20)

Enclosure curtain of burlap or similar material for entry, exit, and pit screening.

Stall partition of burlap or similar material.

Pit 1 foot wide, 6 feet long, minimum depth 2 feet.

Straddle boards approximately 2 inches by 6 inches by 6 feet, held in place with crossboards 1-inch by 6 inches by 2 feet. Hold post of sturdy pipe or wood approximately 4½ feet long.

Urinal trench approximately 18 inches wide and 18 inches deep, length dependent on number of pits.

(2) Operation

Separate facilities for men and women should be well away (at least 50 feet) from areas used for storage preparation, and service of food.

The following ratio of latrines is suggested for food workers:

Men—1 seat and 1 urinal per 10 workers.

Women—1 seat per 8 workers.

Provide a handwashing facility near the latrine area, stocked with a supply of water, soap, disinfecting solution, paper towels, and a disposal receptacle.

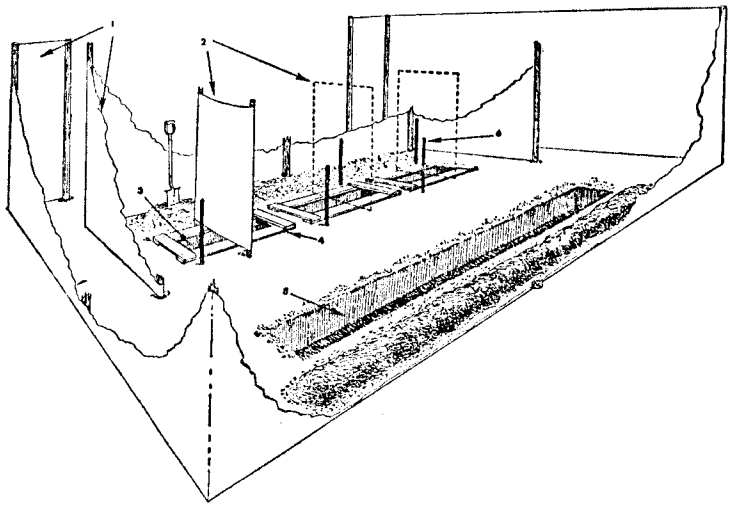


FIGURE 20.—Outdoor pit latrine.
(1 and 2. Curtains. 3. Pit. 4. Straddle boards.
5. Urinal trench. 6. Hold post.)

Keep supply of toilet paper in large covered containers to protect against weather.

Keep latrines well lighted, and doors and windows screened if possible.

Assign monitors to keep check on latrines and maintain cleanliness.

When latrines become filled within 1 foot of the surface, close the site and locate new latrine.

To close latrine:

Cover all pit contents with minimum of 2 feet of earth and pack down firmly.

Spray area with oil or DDT.

Mound earth 12 to 18 inches above pit and pack firmly.

If animals are likely to unearth latrine contents, mix broken glass or other obstructive material with earth used to fill the pit.

Mark the site "CLOSED LATRINE".

NOTE: If temporary latrine facilities must be provided for diners, the same type of construction and operation as that suggested for food workers may be adapted. Latrines for diners should be located at least 300 feet from the serving area.

j. *Incinerator*

(1) Materials needed

One 55-gallon drum with both ends removed. Approximately ten pieces of scrap iron 2 feet long for grate (such as pipe, angle iron, or ½-inch round iron).

(2) Procedure

Dig crossfire trench and add grating as shown in Figure 13 Page 135.

Place open-end drum on grate.

(3) Operation

Build hot fire in fire pit.

Add garbage and combustible trash in small quantities.

Keep fire hot with additional fuel as required.

Remove unburned residue and bury. (See Emergency Waste Disposal, Section 3, Page 81, this handbook.)

Building and Maintaining Outdoor Fires

General Instructions

a. Before building a fire, clear the ground for at least 5 feet around the site.
b. Dry, dead wood makes good fuel.
c. Avoid wet, soft, rotten, or green wood.
d. Split wood burns better than unsplit wood.
e. Fire must be replenished.
f. *The fire should never be left unattended.*
g. *Never* use gasoline, oil, grease, or other flammable liquid in starting a fire.

To Start Outdoor Fires

a. Use timber and kindling, such as bark curls, wood shavings, fine dry twigs or fuzzy sticks and paper, or shaved paraffin candles. Add split soft wood, such as pine, maple, cottonwood, or spruce, construction salvage, or framing boards.
b. Line the fire pit base with crumpled paper; ignite.
c. Place small pieces of kindling on the lighted paper and continue to add larger pieces of light wood in crisscross arrangement.
d. When light wood is burning briskly, add heavier wood.
e. Spread the burning wood and hot ashes over the length of the fire pit. Place 1 or 2 new pieces of wood on the hot ashes.

To Maintain Outdoor Fires

a. Use hard woods that burn evenly and leave a good bed of coals, such as hickory, locust, maple, oak, apple, beech, and white ash, or charcoal briquets or coal.
b. Keep wood supply covered and dry.
c. Add a small amount of fuel often to keep fire efficient and to maintain an even cooking temperature.

Safety Practices for Food Workers

To Prevent Burns

1. Turn handles of utensils away from edge of the stove to prevent tipping and spilling hot liquids.
2. Put out fat fires in frying pans by clamping a tight lid over flame to shut out air. Do not use water!
3. Use well-padded, dry pot holders to handle hot pans or lids. Never use towels or aprons.
4. Use tongs or gloves to protect hands and arms when removing food from oven.
5. In taking lids off kettles, lift the lid slowly, further edge first to permit steam to escape away from arms and face.
6. Avoid using flammable cleaning fluids. If they must be used, use them out of doors. Always be sure they are stored and used away from fires.
7. Keep matches in covered cans and provide a metal container for burned matches.

To Prevent Cuts

1. Provide a holder or a safe place for sharp knives. Do not store them loosely in drawers with other kitchen equipment.
2. Wash sharp knives by themselves. Do not put in dishpan with other utensils.
3. Use broom and dustpan to pick up broken glass. Wrap, mark and place glass in a special container for disposal.
4. Use can opener that leaves a turned edge in cutting.

To Prevent Falls

1. Clean up any spilled fat, water, or food immediately.
2. Use a sturdy stepladder. Do not stand on chairs, stools, or tables.
3. Keep passageways and stairs clear of boxes, brooms, mops, and other obstructions.

4. Provide adequate lighting at steps.
5. Wear comfortable, low-heeled shoes.

To Prevent Injury

1. Do not touch electrical outlets or equipment with wet hands or while standing on wet floor. Disconnect all electrical equipment before cleaning it.
2. Demonstrate or have demonstrated the proper use of mechanical and electrical equipment, such as coffee urns, pressure cookers, electric mixers, water heaters, and meat slicers.
3. Replace worn or damaged electrical accessories, such as cords and plugs, as soon as wear or damage is apparent.
4. Keep hands away from moving parts. Watch sleeves, apron strings, ties and jewelry which can be accident hazards around machines.
5. Always close drawers and doors of ovens and cupboards.
6. Have sufficient light in work areas. Replace burned out bulbs.
7. Watch swinging doors.
8. Use proper techniques for lifting heavy objects.

To Prevent Fires

1. Keep hoods and ducts free of grease.
2. Before lighting a gas oven make sure there is no gas leakage.
3. Keep a smother type fire extinguisher in a convenient place near the stove.

To Care for Injury

1. Always have a standard first-aid kit available; inform workers about its location and uses; and require them to use it.
2. Promptly inform the supervisor of any injury to yourself or another worker.

INDEX OF APPENDICES

WEIGHTS, MEASURES, AND EQUIVALENTS

Abbreviations for Weights and Measures

tsp.	teaspoon	oz.	ounce
tbsp.	tablespoon	lb.	pound
c.	cup	gal.	gallon
pt.	pint	bu.	bushel
qt.	quart	bbl.	barrel
pk.	peck		

Equivalent Weights and Measures

Dry or Fluid Measures,

Measure	*Equivalent*	*Weight*
3 teaspoons	1 tablespoon	½ ounce
2 tablespoons	⅛ cup	1 fluid ounce
4 tablespoons	¼ cup	2 ounces
5 tablespoons—plus 1 teaspoon	⅓ cup	2⅔ ounces
6 tablespoons	⅜ cup	3 ounces
8 tablespoons	½ cup	4 ounces
16 tablespoons	1 cup	8 ounces
1 cup	½ pint	8 fluid ounces
2 cups	1 pint	16 fluid ounces or 1 pound
2 pints (4 cups)	1 quart	2 pounces
4 quarts	1 gallon	8 pounds
8 quarts	1 peck	
4 pecks (32 quarts)	1 bushel	

Fluid Measures

Measure	*Equivalent*	*Weight*
1 fluid quart	4 8-ounce cups	32 ounces
1 barrel		31½ gallons
2 barrels	1 hogshead	63 gallons

Weights, Mesaures, and Equivalents (Continued)

Measures and Metric Equivalent

Measure	*Equivalent*	
	Volume	*Weight*
1/5 teaspoon	1 cc.	1 gram
1 teaspoon	5 cc.	5 grams
1 tablespoon	14 cc.	15 grams
2 tablespoons	28 cc.	1 ounce (28.34 grams)
1 cup	225 cc.	8 ounces (240 grams)
1 liter	1000 cc. (1.06 quart)	2.2 lbs. (1000 grams or 1 kilogram)

Other Useful Measures and their Equivalent Weights

Measure	*Weight*
1 tablespoon butter	½ ounce
1 tablespoon flour	¼ ounce
1 tablespoon sugar	3/5 ounce
1 cup flour	4½ ounces
1 cup butter	8 ounces (½ pound)
1 cup sugar	10 ounces

Bulk Measures and Their Equivalent in Weight

Measure	*Equivalent weight (approximate)*
1 bag rice or navy beans	100 pounds
1 sack flour, cornmeal, sugar	100 pounds
1 sack potatoes	100 pounds
1 bushel most root vegetables	50 pounds
1 crate cabbage	80 pounds
1 sack corn (100 ears)	55 pounds
1 bushel apples	48 pounds
1 box oranges (California)	70 pounds (176 count)
1 box oranges (Florida or Texas)	90 pounds (200 count)
1 box grapefruit (California)	68 pounds
1 box grapefruit (Florida or Texas)	80 pounds
1 box dried fruits	20-25 pounds
1 carton of chip butter or margarine	5 pounds (160 ½-ounce chips)
1 can shortening	50 or 100 pounds
1 bag salt	25 or 50 pounds
1 case eggs	30 dozen
1 tin peanut butter	25-50 pounds
1 drum of lard	400 pounds

Useful Weights and Their Equivalent in Measures

Weight	*Equivalent measure or number (approximate)*
1¼ pounds unsifted flour	1 quart (5 8-oz. cups)
2 pounds sugar	1 quart
1 pound grated cheese	1 quart
1 pound cocoa	1 quart

Useful Weights and Their Equivalent in Measures (Continued)

Weight	*Equivalent measure or number (approximate)*
1¼ pounds raw macaroni	1 quart
2½ pounds rice	1 quart
1 pound rolled oats	1½ quarts (6 cups)
2 pounds dried beans	1 quart
2 pounds uncooked farina-type cereal	1 quart
1 pound baking powder	2½ cups
1 pound loaf bread	18 slices, ½-inch
2 pound loaf sandwich bread	36 to 40 slices, thin
1 pound butter	2 cups
1 pound coffee (coarse)	5 cups
1 pound cornmeal (coarse)	3 cups
1 pound cornmeal (fine)	4 cups
1 pound crackers (2-inch by 2-inch)	108 crackers
1 pound cube sugar	96 cubes
1 pound whole fresh eggs	9-11 eggs (2 cups)
1 pound whole dried eggs	4 cups
1½ ounces (2 tablespoons) whole dried egg plus 2½ tablespoons water	1 large egg
1 ounce cheese	1 cube, 1-inch square
1 ounce jam	1½ tablespoons
1 ounce peanut butter	2 tablespoons

Equivalent Substitutions

Thickeners

1 ounce flour	3½ whole eggs or 7 egg yolks
1 ounce flour	1⅓ ounces minute tapioca
1 ounce flour	¾ ounce breadcrumbs
1 ounce flour	⅔ ounce cornstarch

Shortening

1 pound butter or margarine	4/5 pound hydrogenated shortening
1 pound butter or margarine	4/5 pound lard or oils
1 pound butter or margarine	⅞ pound chicken fat
1 cup butter or margarine	2½ cups 40 percent cream
1 cup butter or margarine	5 cups 20 percent cream
1 cup lard	1 cup plus 1½ tablespoons vegetable fat
1 cup butter	⅞ cup lard (1 cup less 2 tablespoons)

Leaveners

½ teaspoon soda	2 teaspoons baking powder
½ teaspoon baking powder	1 egg white

Milk and cream

1 cup coffee cream	4/5 cup milk plus 1/5 cup fat
1 cup heavy cream	3/5 cup milk plus 2/5 fat

Chocolate and cocoa

1 ounce chocolate	3 tablespoons cocoa plus 1 teaspoon fat

Scoops and Ladles

The number of the scoop indicates the number of level scoopfuls obtained from a quart. Servings will vary somewhat because scoop portions may be rounded by some and packed by others.

Scoop size	*Level measure*
No. 6	⅔ cup
No. 8	½ cup
No. 10	2/5 cup
No. 12	⅓ cup
No. 16	¼ cup
No. 20	3-1/5 tablespoons
No. 24	2⅔ tablespoons
No. 30	2-1/5 tablespoons
No. 40	1-3/5 tablespoons

Content of Common Sizes of Cans

Can size	*Number in case*	*Average weight*	*Average cups per can*
8 ounces	48 and 72	8 ounces	1 cup
No. 1 picnic	48	10½-12 ounces	1¼ cups
No. 300	24	14-16 ounces	1¾ cups
No. 303	24	16 ounces	2 cups
No. 2	24	20 ounces	2½ cups
No. 2½	24	29 ounces	3½ cups
No. 3 cylinder	12	46 fluid ounces	5¾ cups
No. 10	6	6 pounds, 8 ounces to 7 pounds, 5 ounces	12 to 13 cups

Can Size Equivalents

Can size	*Equivalent*
No. 10	7 No. 303 (1 pound) cans
No. 10	5 No. 2 (1-pound 4-ounce) cans
No. 10	4 No. 2½ (1-pound 13-ounce) cans
No. 10	2 No. 3 cyl. (46-to 50-ounce) cans

RECIPES

General

1. The recipes included in this appendix have been selected mainly because they are nourishing and require a minimum of ingredients, time and labor to prepare.
2. The recipes shown are for yields of 100 portions. Larger amounts, in some instances, may be prepared with satisfactory results by multiplying the ingredients in a recipe for 100 by the unit number desired.
3. The capacities of eating utensils generally used in serving liquid portions are as follows:

Coffee cup, standard	6 ounces
Paper hot drink cup	6 ounces
Paper bowl, small	8 ounces
Paper bowl, large	12 ounces

Recipes by Types

1. *Beverages*
   a. Coffee in disaster
      (1) In times of stress a cup of good coffee helps lift morale and gives comfort. Knowing how to brew good coffee in large quantities is an important skill for food workers because of its widespread use in emergency feeding operations.
      Instant coffee is convenient, and no more expensive to use for serving large groups. If instant coffee is available, the ease of preparation and time saving favor its use. If urns, glass coffee makers or other standard equipment are available their use is also favored.
      If none of these are available, coffee can be brewed the "old fashioned" way in a stock pot or kettle, with or without using a cloth sack.

(2) General rules for brewing good coffee

Use freshly drawn cold water.

Use fresh coffee.

Measure accurately.

Since freshly made coffee is best, make only the amount needed for immediate serving.

Keep coffee hot but just under boiling.

Keep equipment clean.

When a cloth sack or filter is used it should be thoroughly rinsed after each use (no soap), and kept immersed in cold water until used again.

(3) Rule-of-thumb formulas

(a) Brewed coffee

1 pound of coffee to 2½ gallons of water yields about 50 (6 ounce portion) cups of beverage.

(4) Kettle method with bag

(a) Unbleached muslin, layers of cheesecloth, coffee sacks, or sugar sacks are suitable for making bags. Never use burlap sacking or other material that has been sized or otherwise treated.

(b) Basic recipe for emergency coffee.

Container	Ingredients	Yield
10-gal. kettle	3 lb. coffee, regular grind 7½ gal. boiling water	7½ gal. coffee (30 qt.) (160 6-oz. portions)

(c) Directions

Place ground coffee in cloth bag large enough to permit circulation of water and expansion of coffee (allow for expansion of as much as 2 or 3 times the amount of coffee used). Fifteen pounds of coffee is the maximum per bag for best results and convenient handling.

Tie the bag securely near the top with strong cord or string long enough to fasten to the handle of the container for easy removal of the bag from the hot brew.

Pour water (freshly drawn if possible) into large kettle or stock pot and bring to a boil.

Place the coffee bag in boiling water; tie cord to handle or make secure otherwise. Reduce heat to keep water at just below boiling *at all times.*

Submerge bag with paddle or stick, pushing up and down to force water through grounds.

Cover kettle and brew coffee 12 to 15 minutes. Lift bag, drain into kettle. Remove.

Empty coffee grounds. Wash bags thoroughly in plain water and place in cold water until used again.

(5) Kettle method without bag

(a) Requires same proportions of ground coffee and water as basic recipe.

(b) Directions

Pour water into container of adequate size.

Heat water to boiling.

Pour ground coffee into boiling water; stir.

Reduce heat to just below boiling.

Brew coffee 10 to 12 minutes, being careful not to boil or overcook.

Settle grounds by sprinkling in a small amount of cold water. To avoid stirring up the grounds, carefully pour or ladle the coffee into another container.

(6) Boston coffee

(a) Boston coffee is a mixture of brewed coffee diluted with an equal part of milk.

(b) Directions

Use half the basic recipe for coffee and brew the coffee.

Scald a mixture of 1½ gallons of evaporated milk and 1½ gallons of water and add to the prepared brew. Stir well over heat.

(7) Instant coffee

(a) Directions

Pour water (freshly drawn if possible) into a container of adequate size.

Heat water to boiling point.

Add boiling water to powdered coffee concentate.

Stir mixture well. Reduce heat.

(b) Yields:

One 2-ounce jar instant coffee to 4 quarts (1 gallon) of water yields about 20 6-ounce portions of beverage.

One 6-ounce jar of instant coffee to 12 quarts (3 gallons) of water yields about 64 6-ounce portions of beverage.

One 8-ounce jar of instant coffee to 16 quarts (4 gallons) of water yields about 84 6-ounce portions of beverage.

One 16-ounce jar (2 8-ounce jars) of instant coffee to 32 quarts (8 gallons) of water yields about 170 6-ounce portions.

b. Cocoa

(Yield: 5 gallons, 100 1-cup portions)

Ingredients	*Amounts*
Cocoa	1¼ pounds (5½ cups)
Sugar	1 pound 14 ounces (3¾ cups)
Salt	¾ teaspoon
Water, cold	2½ quarts
Milk, fresh or evaporated	4½ gallons, or 18 tall cans plus 2¼ gallons of water
Vanilla, optional	1 ounce

Directions

(1) Combine cocoa, sugar and salt with enough water to make a paste.

(2) Add remainder of water gradually. Bring to boiling point; boil 5 minutes, stirring constantly.

(3) Add milk and reheat mixture.

(4) Beat well before serving.

c. Tea (emergency method)

(Yield: 8 gallons, 170 1-cup portions)

Ingredients	*Amounts*
Tea, loose	½ pound (three 8-ounce cups)
Water, boiling	8 gallons (32 quarts)

Directions

(1) Tie tea in cloth bag large enough to hold at least three times the amount of dry tea. Allow enough room for expansion of leaves when tying the bag.

(2) Tie cord to the container to make it easy to pull bag out of the water.

(3) Drop bag into kettle of boiling water, cover tightly.

(4) Reduce heat to prevent boiling; brew 5 to 7 minutes.

(5) Plunge bag up and down several times; remove bag from the brew.

(6) If bag is not used and tea is put directly into the boiling water, strain beverage as soon as it is brewed. Otherwise, it will develop an undesirable flavor.

2. *Soups*

a. Bean chowder

(Yield: 6¼ gallons, 100 1-up portions)

Ingredients	*Amounts*
Beans, dry, white	7 pounds (4½ quarts)
Water	4¼ gallons (17 quarts)
Pork, salt, diced (optional)	3 pounds (2 quarts)
Potatoes, diced	4 pounds (2½ quarts)
Onions, chopped	12 ounces (1½ pints)
or	
Onions, dehydrated	1 ounce (8 tablespoons)
Tomatoes	2 No. 10 cans
Sugar, granulated	3 ounces (6 tablespoons)
Salt	1 ounce (2 tablespoons)
Pepper	1 teaspoon

Directions

(1) Wash beans. Add enough water to cover beans; soak 6 to 8 hours or overnight.

(2) Add remaining water and one-half the salt pork. Cover and heat to boiling point; reduce heat and simmer about 2 hours or until skins of beans begin to burst.

(3) Add potatoes and continue simmering.

(4) Fry remaining salt pork until crisp; remove from fat and drain.

(5) Fry onions in pork fat until tender. Add tomatoes, sugar, salt, and pepper; mix well.

(6) Cover and heat to boiling point; reduce heat and simmer about 20 minutes.

(7) Add crisp pork cubes just before serving.

b. Corn chowder

(Yield: 6 gallons, 100 1-cup portions)

Ingredients	*Amounts*
Stock (or water)	3½ gallons
Salt pork, cubed (optional)	2 pounds (1 quart)
Onions, chopped	1 pound (3½ cups)
Celery, chopped (optional)	½ pound (2 cups)
Potatoes, diced raw	2 pounds (1¼ quarts)
Green pepper, chopped (optional)	½ pound (2 cups)
Salt	4 ounces (½ cup)
Pepper	½ ounce (1¾ tablespoons)
Corn	13 pounds, 4 ounces (2 No. 10 cans)
Milk, evaporated	4 pounds, 7 ounces (2 quarts)

Directions

(1) Cut the salt pork in small cubes.
(2) Cook pork slowly with the chopped onions until the onion is tender but not browned.
(3) Add to stock.
(4) Add chopped vegetables to stock and simmer 20 minutes.
(5) Add salt, pepper, corn, and milk to stock and simmer until blended and all vegetables are tender.

c. Chicken noodle soup

(Yield: 7 gallons, 100 1-cup portions)

Ingredients	*Amounts*
Soup, chicken noodle (dehydrated)	4¾ pounds (1 No. 10 can)
Water, boiling	7 gallons

Directions

(1) Add soup mix to boiling water.
(2) Boil 7 minutes.

d. Corn and chicken noodle soup

(Yield: 7 gallons 100 1-cup portions)

Ingredients	*Amounts*
Soup, chicken noodle (dehydrated)	4¾ pounds (1 No. 10 can)
Water, boiling	20 quarts
Corn, cream style	12 No. 2 cans
Onions, chopped	1 pound (1 quart)
or	
Onions, dehydrated	1 ounce (8 tablespoons)
Salt	2½ ounces (5 tablespoons)
Milk, powdered	2¼ pounds (9 quarts)
or	
Milk, evaporated	9 No. 1 (14½-ounce) cans
Cold water, for milk	2 quarts

Directions

(1) Add soup mix, corn, onions, and salt to the boiling water.
(2) Bring to boiling point; cook 7 minutes.
(3) Reconstitute the powdered milk in the cold water.

(4) Add milk to mixture just prior to serving, and reheat.

e. Navy been soup

(Yield: 6 gallons, 100 1-cup portions)

Ingredients	*Amounts*
Navy beans, dried	5½ pounds (3¼ quarts)
Water, cold	To cover
Ham stock	5 gallons
Onions, chopped	1 pound (3 cups)
Ham bones (optional)	8
Cloves, whole (optional)	1 teaspoon
Flour (optional)	½ pound (1 pint)
Water, cold (optional)	1 quart
Pepper	2 teaspoons
Salt, if needed	4 ounces (½ cup)

Directions

(1) Wash and soak beans in water to cover 3 to 4 hours. Drain.
(2) Add ham stock, bones, onions, and clove.
(3) Heat to boiling. Simmer 2 to 3 hours. Remove bones.
(4) Blend together flour and water to a smooth paste. Stir into soup. Add pepper and salt, if needed. Reheat to boiling.

Variation: Bean soup with tomatoes. To above recipe add 1 No. 10 can (3 quarts) tomatoes to ham stock before simmering.

f. Onion soup (dehydrated)

(Yield: 6 gallons, 100 1-cup portions)

Ingredients	*Amounts*
Onions, dehydrated	1 pound, 2 ounces (1¾ quarts)
Water, for onions	8 pounds (1 gallon)
Fat	2 pounds (1 quart)
Flour	½ pound (2 cups)
Bouillon cubes	70
Water, hot, for bouillon stock).	5 gallons
Salt	3 ounces (6 tablespoons)

Directions

(1) Stir onions into water and let soak 60 minutes. Cover.
(2) Heat to boiling. Let simmer 15 to 20 minutes or until tender. Drain and reserve liquid.
(3) Heat fat to frying temperature. Add reconstituted onions and cook until lightly browned. Stir frequently.
(4) Add flour gradually to fried onions and stir until flour is well distributed.
(5) Dissolve bouillon cubes in water. Add reserved liquid.
(6) Add part of hot stock to thin out the onion-flour paste. Combine thinned paste with remainder of stock.

(7) Add salt and let simmer 60 minutes.

g. Vegetable soup (No. 1)

(Yield: 6¼ gallons, 100 1-cup portions)

Ingredients	*Amounts*
Water	24 quarts
Carrots, dehydrated	10 ounces (¾ quart)
Potatoes, dehydrated	1 pound (1½ quarts)
Onions, dehydrated	6 ounces (¾ quart)
Salt	5 ounces (10 tablespoons)
Rice, dry	1 pound (1 pint)
Tomatoes, canned	2 No. 10 cans
Pepper	½ tablespoon
Bouillon cubes	72

Directions

(1) Add dehydrated vegetables to water and soak 20 to 40 minutes. Bring gradually to the boiling point in a covered stockpot.

(2) Add salt, rice, tomatoes, pepper, and bouillon cubes and continue to simmer for 1 hour or until all vegetables are tender.

h. Vegetable soup (No. 2)

(Yield: 6¼ gallons, 100 1-cup portions)

Ingredients	*Amounts*
Water	24 quarts
Meat and vegetable stew	15 30-ounce cans or 37 12-ounce cans
Tomato juice, canned	1 No. 10 can
Salt	4 ounces (8 tablespoons)
Pepper	¼ ounce (1 tablespoon)

Directions

(1) Use large stockpot (10 gallons). Add water, meat and vegetable stew, tomato juice, and seasonings.

(2) Bring to the boiling point and simmer for 20 minutes.

i. Vegetable chicken soup

(Yield: 6 gallons, 100 1-cup portions)

Ingredients	*Amounts*
Soup, chicken noodle (dehydrated)	4¾ pounds (1 No. 10 can)
Water, boiling	6 gallons
Salt	2½ ounces (5 tablespoon)
Tomatoes	1 No. 10 can
Onions, chopped	1½ pounds (1½ quarts)
or	
Onions, dehydrated	1½ ounces (12 tablespoons)
Lard (or fat drippings)	½ pound (½ pint)

Directions

(1) Add all ingredients to boiling water.

(2) Bring to boil and cook 7 minutes.

j. Vegetable soup (No. 3)

(Yield: 6 gallons, 100 1-cup portions)

Ingredients	*Amounts*
Beef stock	4½ gallons
Carrots, diced	3 pounds
Celery, chopped	2 pounds (2 quarts)
Onions, chopped	2 pounds (1½ quarts)
Peppers, chopped	½ pound (½ quart)
Potatoes, diced	3 pounds (2 quarts)
Cabbage, chopped	2 pounds (2 quarts)
Tomatoes	12¾ pounds (2 No. 10 cans)
Salt	5 ounces (⅝ cup)
Pepper	½ ounce (1 tablespoon)

Directions

(1) Heat stock in stock pot.

(2) Add diced carrots, chopped celery, and onions to stock and simmer until vegetables are almost tender.

(3) Add remaining ingredients and simmer about 30 minutes. If necessary, more water may be added.

k. Vegetable Soup with Bulgur Wheat

Ingredients	*Amounts*
Soup stock	6 gallons
Large onions	20
Bulgur wheat (cooked)	5 quarts
Salt	To taste
Pepper	To taste

Directions

(1) Heat soup stock to boiling.

(2) Add onions and any other desired vegetables.

(3) Cook until tender.

(4) Add cooked bulgur wheat and bring to boil.

3. *Breads*

a. Biscuit mix with nonfat dry milk

(Yield: 6½ pounds mixture, 100 portions)

Ingredients	*Amounts*
Sifted flour	4 pounds (4 quarts)
Dry milk	¾ pound (3 cups)
Baking powder	½ cup
Salt	2 tablespoons
Fat	3 cups

Directions

(1) Sift dry ingredients together three times, if possible, or mix ingredients thoroughly.

(2) Rub or cut in the fat.

(3) Store in tightly covered container until ready to use.

For making drop biscuits

(4) Add enough water (about 1½ quarts) to the above dry mix to make a very soft dough.

(5) Drop by spoonfuls on ungreased baking sheet.
(6) Bake in hot oven (450° F.) for 12 to 15 minutes.

b. Cornbread

(Yield: 24¾ pounds mixture, 100 portions)

Ingredients	*Amounts*
Flour, sifted	5 pounds (1¼ gallons)
Sugar, granulated	2 pounds (1⅛ quarts)
Cornmeal	4¾ pounds (3½ quarts)
Baking powder	9 ounces (1½ cups)
Salt	1 ounce (2 tablespoons)
Milk	9 pounds (1⅛ gallons)
Eggs, beaten	1 pound 4 ounces (12 eggs)
or	
Eggs, powdered	4¾ ounces
and	and
Water	1¾ cups
Shortening, melted	2¼ pounds (1⅛ quarts)

Directions

(1) Sift flour, sugar, cornmeal, baking powder, and salt together.
(2) Mix milk and water, add beaten eggs.
(3) Add milk and egg mixture to dry ingredients; partially mix. Add melted shortening, stir only until dry and liquid ingredients are combined. Avoid overmixing.
(4) Spread mixture in greased baking pans. Bake in hot oven (425° F.) about 25 to 30 minutes.

c. Cornbread (with dried whole egg)

(Yield: 100 portions)

Ingredients	*Amounts*
Water	1½ cups
Dried whole egg	5 ounces (1¼ cups firm-packed)
Sifted flour	3 pounds (3 quarts)
Baking powder	4½ ounces (2/3 cup)
Sugar	10 ounces
Salt	3 tablespoons
Cornmeal	2½ pounds (7½ cups)
Milk	2½ quarts
Melted fat (or oil)	2½ cups

Directions

(1) Add ¾ cup water to the dried egg; beat until smooth. Add remaining ¾ cup water and beat well.
(2) Sift flour, baking powder, sugar, and salt together twice. Add cornmeal and mix well.
(3) Combine milk and fat, or oil, with egg and add to dry ingredients.
(4) Pour into well-greased baking pans.
(5) Bake at 425° F. (hot) 30 to 40 minutes until brown.

4. *Cereals*

Cereal	Approximate quantity		Salt[a]	Water[b]	Cooking Time		Serving size for 100 portions
	Weight	Amount			Steam jacketed kettle	Double boiler	
	Pounds	*Quarts*	*Tablespoons*	*Gallons*	*Minutes*	*Minutes*	*Cup*
Regular:							
Rolled oats	6	9	6	5	20	30–45	2/3
Wheat cereals	6	4½	6	5	20	30–45	2/3
Cornmeal	6	4½	6	6	20–30	60	3/4
Hominy grits	6	4	6	6	20–30	60	3/4
Quick cooking:							
Rolled oats	6	9	6	4¾	5	5–10	2/3
Wheat cereals and whole wheat cereals	6	4½	6	4¾	5	5–10	2/3

[a] It may be necessary to increase the amount of salt.
[b] The amount of water needed may vary according to the method of cooking, the type of utensil used, and the length of the cooking period.

Directions

a. Steam jacketed kettle
   (1) Add salt to water; heat to boiling. Amounts of salt and water may vary according to the method of cooking, the type of utensil used, and the length of cooking period.
   (2) Add cereal gradually, stirring to prevent lumping. Bring to a boil; reduce heat and simmer until thick, stirring occasionally to prevent lumping.

b. Double boiler
   (1) Place water in top of double boiler. Add salt. Heat to boiling.
   (2) Stir in cereal gradually. Continue stirring until thickened.
   (3) Place top of double boiler over bottom, filled to two-thirds capacity with boiling water.
   (4) Cook without stirring until done.

c. Variations in serving cooked cereals
   (1) Hot cooked cereals may be served with milk and sugar. Raisins, chopped seeded dates, or chopped dried figs may be added to the cereal a few minutes before serving.
   (2) Cooked cornmeal, oatmeal, bulgur or hominy grits may be fried. Pour the cooked cereal into well-greased pans to a depth of about 1 inch. Cool, cut into squares, and wry. If the squares are moist, dip

in flour before frying. Serve with syrup or jelly, or tomato or cheese sauce.

5. *Eggs*

a. Eggs are a protein food and must be cooked at low temperatures. High temperature toughens egg whites and darkens the yolks.

b. Soft and hard cooked eggs

(Yield: 100 portions.)

Ingredients	*Amounts*
Eggs	200
Water, boiling	To cover

Directions

(1) Place 100 eggs at a time in a large wire basket or other similar utensil with long handle.

(2) Lower basket into boiling water; reduce heat and simmer 3 to 5 minutes for soft cooked eggs and 12 to 15 minutes for hard cooked eggs.

(3) Remove from water. Plunge hard cooked eggs into cold water. If hard cooked eggs are to be used in salads or other prepared dishes, remove shells immediately after plunging in cold water. Refrigerate.

6. *Vegetables*

a. Buttered carrots

(Yield: 100 ½-cup portions.)

Ingredients	*Amounts*
Carrots, dehydrated	4 pounds (4½ quarts or 1½ No. 10 cans)
Water, cold (for carrots)	16 quarts (32 pounds)
Sugar, granulated	2 ounces (4 tablespoons)
Butter or margarine	1 pound (1 pint)
Salt	3 ounces (6 tablespoons)
Pepper	¼ ounce (1 tablespoon)

Directions

(1) Soak carrots in cold water for 45 to 60 minutes.

(2) Bring slowly to boil, then simmer until tender.

(3) Remove from the stove; add the sugar, fat, salt, and pepper, and stir until thoroughly mixed.

b. Buttered sweetpotatoes

(Yield: 100 ½-cup portions.)

Ingredients	*Amounts*
Sweetpotatoes, dehydrated	7½ pounds (10 quarts)
Water, cold	15 quarts
Salt	1 ounce (2 tablespoons)
Butter or margarine	2 pounds (1 quart)

Directions

(1) Soak potato slices for 40 to 60 minutes.

(2) Slowly bring to a boil. This should require 40 to 50 minutes. It is important that the potatoes be tender and moist at this stage. Be sure to cook sufficiently.

(3) Drain off and reserve the surplus water, add salt and fat, and mash by stirring vigorously.

(4) Place in large baking pan, add the surplus water which was previously drained off, stir, and bake for 20 minutes in a moderate oven.

c. Cole slaw

(Yield: 100 ½-cup portions.)

Ingredients	*Amounts*
Vinegar	1¼ quarts
Sugar	2 pounds (1 quart)
Celery seed (optional)	2 tablespoons
Salt	1 tablespoon
Pepper	2 teaspoons
Shredded cabbage	14 pounds (3½ gallons)

Directions

(1) Combine vinegar, sugar, celery seed, salt, and pepper. Mix well.

(2) Stir vinegar mixture into shredded cabbage and allow to stand at least 10 minutes. Serve cold.

d. Diced beets and bacon

(Yield: 100 ¼-cup portions.)

Ingredients	*Amounts*
Beets	25 pounds
Water, boiling	To cover
Bacon, sliced, chopped	2 pounds
Vinegar	To taste

Directions

(1) Remove beet tops about 3 inches from the beets, leaving tap root attached. Wash beets thoroughly without breaking the skin. If the skin is broken, juice will escape from the beets while cooking.

(2) Add enough boiling water to cover beets. Heat to boiling point; reduce heat and simmer 30 to 35 minutes or until tender. Drain; reserve liquid.

(3) Cool and remove stems and skins with fingers; slice.

(4) Fry bacon crisp. Add beets and heat through.

(5) Add salt and pepper; mix well.

(6) Add vinegar if desired.

e. Pickled beets

(Yield: 100 ¼-cup portions.)

Ingredients	*Amounts*
Beets, dehydrated	3½ pounds (4 quarts)
Water, cold (for beets)	12 quarts (3 gallons)
Onions, dehydrated	5 ounces (1 pint)
Water (for onions)	1½ quarts
Sugar, granulated	8 ounces (½ pint)
Salt	1½ ounces (3 tablespoons)
Pepper	¾ ounce (3 tablespoons)
Vinegar	1½ quarts

Directions

(1) Soak beets and onions separately 20 to 40 minutes.

(2) Bring beets slowly to a boil and cook 15 to 20 minutes after they reach the boiling point. The 100-portion recipe should require 50 to 60 minutes total time, a smaller amount, 25 to 35 minutes.

(3) Bring vinegar to a boil and pour over the reconstituted onions, sugar, salt, and pepper. Drain the beets and add to the onion-vinegar mixture. Cool for 4 hours. Serve as cold as possible.

f. Simmered lima beans

(Yield: 100 1-cup portions.)

Ingredients	*Amounts*
Beans, lima, dry	12 pounds
Butter or margarine	1½ pounds
Salt	¼ ounce
Pepper	¼ ounce

Directions

(1) Wash beans thoroughly. Cover with cold water. Soak 3 to 4 hours. Drain and cover with fresh water.

(2) Cover and heat to boiling point; add salt, reduce heat and simmer until tender but not split or mushy. Drain.

(3) Add fat, salt, and pepper to beans and heat to serving temperature.

7. *Main dishes*

a. Baked beans

(Yield: 100 1-cup portions.)

Ingredients	*Amounts*
Navy beans	16 pounds
Boiling water	4 gallons
Salt pork, sliced (optional)	3 pounds
Pepper	1 teaspoon
Brown sugar	2 pounds (4-2/3 cups, well packed)
Dry mustard	¼ cup
Salt	4 ounces (½ cup)
Onion, chopped	1½ pounds (1 quart)
Molasses	1 quart

Directions

(1) Cover beans with water and boil 2 minutes. Remove from heat, cover, and let stand for 1 hour. (If more convenient, soak beans overnight.)

(2) Drain beans, and heat the drained liquid.

(3) Place half of beans in roasting pans.

(4) Cover beans with half of the slices of salt pork.

(5) Spread the rest of the beans over salt pork. Top with remaining slices of salt pork.

(6) Combine pepper, sugar, mustard, salt, onion, and molasses. Pour mixture over beans.

(7) Add the hot drained liquid. (Add water as needed to moisten the beans during baking.)

(8) Cover pans and bake at 300° F. (slow) for 7 to 8 hours.

b. Baked beans (canned) and bacon

(Yield: 100 2/3-cup portions.)

Ingredients	*Amounts*
Beans, baked	4 No. 10 cans
Onion, chopped	1½ pounds (1½ quarts)
or	
Onions, dehydrated	2¼ ounces (1½ measuring cups)
Catsup (optional)	1 quart
Bacon, sliced	4 pounds

Directions

(1) Combine baked beans and catsup; pour into baking pans.

(2) Slice and fry bacon; fry onions in bacon fat; add onions and bacon fat to beans. Stir well. Place bacon strips on top of beans.

(3) Bake in moderate oven (375° F.) about 40 minutes or until beans are hot.

(4) Beans may be heated on top of stove. Fry bacon and onions; add to beans. Stir occasionally.

c. Beef stew (using canned roast beef and gravy)

(Yield: 100 1-cup portions.)

Ingredients	*Amounts*
Onions, dehydrated	8 ounces (1 quart)
Carrots, dehydrated	14 ounces (1 quart)
Potatoes, dehydrated	4 pounds (6 quarts)
Water (for vegetables)	13 quarts
Tomatoes, canned	1 No. 10 can
Roast beef and gravy, canned	27½ pounds (13 34-ounce cans)
Salt	4½ ounces (tablespoons)
Pepper	¼ ounce (1 tablespoon)

Directions

(1) Soak carrots in water for 45 minutes. Bring slowly to the boiling point. Add potatoes. Combine with tomatoes and onions and simmer until vegetables are tender but not mushy.

(2) Add meat and seasoning and heat to a serving temperature. Avoid stirring vigorously after meat has been added as it breaks up readily.

d. Baked frankfurters and rice

(Yield: 100 ¾-cup portions.)

Ingredients	*Amounts*
Frankfurters (cut in ½-inch slices)	9 pounds
Tomatoes, cooked	1½ gallons
Green pepper, chopped (optional)	1¼ pounds (1 quart)
Onion, chopped	3 pounds (2 quarts)
Cheese, grated	4½ pounds (1⅛ gallons)
Rice, cooked	12 pounds (2 gallons)
Salt	1½ ounces (3 tablespoons)

Directions

(1) Combine all ingredients.

(2) Pour into greased baking pans.

(3) Cover and bake at 400° F. (hot) for 50 minutes. Uncover and bake 15 minutes longer or until green pepper and onion are tender.

e. Bulgur wheat pilaf.

(Yield: 100 ¾-cup portions.)

Ingredients	*Amounts*
Bulgur wheat	5 quarts
Fat	1 quart
Chopped onion	2 gallons
Meat or chicken broth	3 gallons
Salt	10 tablespoons

Directions

(1) Melt fat, add bulgur wheat and onion. Cook until golden brown, stirring constantly.

(2) Add broth and salt.

(3) Cover tightly and simmer for 15 minutes.

f. Cheese bean loaf (with dried whole egg)

(Yield: 100 1/3-cup portions.)

Ingredients	*Amounts*
Chopped onions	9 ounces (1½ cups)
Chopped celery	1½ pounds (1½ quarts)
Fat	6 ounces (¾ cup)
Water	2½ cups
Dried whole egg	8 ounces (2 cups firm-packed)
Cooked kidney or other beans, ground or mashed (about 4 pounds uncooked dry beans).	5½ quarts
Bean liquid	2 cups
Cheese, finely grated	5 pounds
Salt	3 tablespoons
Bread crumbs, soft	1½ pounds

Directions

(1) Cook onions and celery in fat until celery is tender.

(2) Add 1¼ cups of the water to dried egg; beat until smooth. Add remaining 1¼ cups water and beat well.

(3) Combine remaining ingredients until well blended, adding bread crumbs last.

(4) Place in greased baking pans.

(5) Bake at 350° F. (moderate) 40 to 45 minutes.

(6) Serve with tomato sauce or with a relish such as cranberry sauce.

g. Diced meat in gravy

(Yield: 100 1-cup portions.)

Ingredients	*Amounts*
Onions, chopped	pound (1 quart)
or	
Onions, dehydrated	1½ ounces (12 tablespoons)
Meat or bacon fat	2 pounds (1 quart)
Flour, sifted	2 pounds (2 quarts)
Meat stock (hot)	2 gallons (8 quarts)
Milk, evaporated	8 14½-ounce cans
Water (for milk)	1 gallon (4 quarts)
Salt	2 ounces (4 tablespoons)
Pepper	¼-ounce (1 tablespoon)
Meat, cooked, diced	23 pounds
Bread or toast	200 slices

Directions

(1) Cook onions slowly in fat until tender. Add flour and mix well.

(2) Add meat stock gradually. Heat to boiling point, stirring constantly.

(3) Mix milk and water. Add milk, salt, and pepper to hot onion mixture, heat to boiling point; boil about 3 minutes, stirring constantly. Remove from heat.

(4) Add cooked meat; reheat to serving temperature.

(5) Serve on bread or toast.

h. Macaroni and cheese

(Yield: 100 ½-cup portions.)

Ingredients	*Amounts*
Elbow macaroni	4 pounds (1 gallon)
Boiling water	2 gallons
Salt	1 ounce (2 tablespoons)
Sauce Ingredients	
Butter or margarine	8 ounces (1 cup)
All-purpose flour	8 ounces (2 cups)
Salt	3 ounces (1/3 cup)
Dry mustard	3 tablespoons
Hot milk	1¾ gallons
Cheese, grated	6 pounds (1½ gallons)

Directions

(1) Cook the macaroni in boiling, salted water until just tender—about 15 minutes. Drain and rinse.

(2) Make sauce: Melt fat and blend in the flour and seasonings. Stir into hot milk and cook until thickened. Add the cheese.

(3) Combine sauce and macaroni.

(4) Pour mixture into greased baking pans.

(5) Bake at 350° F. (moderate) for 45 minutes.

i. Macaroni with tomatoes and cheese

(Yield: 100 1½-cup portions.)

Ingredients	*Amounts*
Macaroni	8 pounds (2½ gallons)
Salt	1 ounce (2 tablespoons)
Water, boiling	8 gallons
Sauce	
Tomatoes or puree	2 No. 10 cans (6½ quarts)
Onions, chopped	2 pounds (2 quarts)
or	
Onions, dehydrated	3 ounces (1½ measuring cups)
Celery leaves (optional)	1 ounce
Sugar, granulated	6 ounces (¼ measuring cup)
Salt	3½ ounces (7 tablespoons)
Pepper	To taste
Butter or margarine	½ pound (1 measuring cup)
Cheese, shredded	4 pounds (4 quarts)

Directions

(1) Break macaroni into 2- to 3-inch pieces.

(2) Add macaroni slowly to boiling salted water; boil 10 to 15 minutes or until macaroni is tender. Drain well.

(3) Combine tomato puree, sugar, onions, celery leaves, salt (3½ ounces), and pepper. Heat to boiling point; reduce heat and simmer 20 minutes.

(4) Add fat and cheese to hot tomato mixture; stir until cheese is melted.

(5) Combine sauce and macaroni.

(6) Place in baking pans. Bake in moderate oven (350° F.) 25 minutes.

(7) Noodles or spaghetti may be substituted for the macaroni.

j. Noodles and buttered crumbs

(Yield: 100 1½-cup portions.)

Ingredients	*Amounts*
Noodles	12½ pounds
Salt	6 ounces (12 tablespoons)
Water, boiling	12½ gallons
Bread crumbs, dry	3 pounds (3 quarts)
Salt	1½ ounces (3 tablespoons)
Pepper	¼ ounce (1 tablespoon)
Butter or margarine, melted	3½ pounds (1¾ quarts)

Directions

(1) Add noodles to boiling water; boil 10 to 15 minutes or until tender. Drain well.

(2) Mix bread crumbs, salt, and pepper; cook in melted fat until bread crumbs are brown.

(3) Mix bread crumbs and noodles together.

k. Salmon loaf (with dried whole egg)

(Yield: 100 ½-cup portions.)

Ingredients	*Amounts*
Rice, uncooked	1½ pounds
Dried whole egg	1⅛ pounds (4½ cups firm-packed)
Water	1½ quarts
Milk	2 quarts
Salt	5 tablespoons
Salmon	10 No. 1 cans (8 pounds)
Lemon juice	½ cup
Lemon rind	1½ tablespoons
Green pepper, finely chopped (optional)	1 cup
Parsley, chopped (optional)	1 cup
Bread crumbs	2 quarts
Baking powder	3 tablespoons

Directions

(1) Cook rice until tender in 1 gallon boiling water to which 3 tablespoons of salt have been added. Drain.

(2) Add 3 cups of water to the dried egg; beat until smooth. Add remaining 3 cups of water and beat well. Add milk and salt.

(3) Flake salmon and combine with salmon liquid, lemon juice and rind, green pepper, parsley, bread crumbs, and rice.
(4) Mix baking powder with egg mixture, and add to other ingredients.
(5) Pour into greased baking pans, set in pans of hot water, and bake at 400 degrees F. (hot) 45 to 55 minutes.

l. Spaghetti tuna loaf

(Yield: 100 1-cup portions.)

Ingredients	*Amounts*
Spaghetti, broken into 2" pieces	6 pounds, dry (1½ gallons)
Cheddar cheese, shredded	6 pounds (1½ gallons)
Evaporated milk	1¼ gallons
Eggs, slightly beaten	2½ pounds (20-25 eggs)
Salt	2 tablespoons
Pimiento, chopped (optional)	1½ cups
Onion, grated (optional)	1½ cups
Canned tuna, flaked but not drained	5¼ pounds (2½ quarts)

Directions

(1) Drop spaghetti into boiling salted water. Cook until tender. Drain and rinse.
(2) Melt cheese in the milk in top of double boiler.
(3) Add hot milk and cheese to the spaghetti. Stir in beaten eggs, seasonings, and tuna. Mix well.
(4) Pour into greased baking pans.
(5) Bake in moderate oven (350° F.) until a knife inserted in center comes out clean, 50 to 60 minutes.

m. Spanish rice

(Yield: 100 1-cup portions.)

Ingredients	*Amounts*
Tomatoes	4 No. 10 cans
Water	3 gallons
Onions, chopped	3 pounds (3 quarts)
or	
Onions, dehydrated	1½ ounces (2½ measuring cups)
Peppers, green chopped	2 pounds (2 quarts)
Salt	8 ounces (1 measuring cup)
Pepper	¼ ounce (1 tablespoon)
Rice, uncooked	12 pounds (6 quarts)
Cheese, shredded	9 pounds (9 quarts)

Directions

(1) Combine tomatoes, water, onions, peppers, salt, and pepper; heat to boiling point.
(2) Wash rice; drain thoroughly.

(3) Add rice to tomato mixture. Cover and heat to boiling point; reduce heat and simmer until rice is tender, stirring frequently.
(4) Remove from heat; add cheese. Stir until cheese is melted.

8. Desserts

a. Peach crisp

(Yield: 100 ½-cup portions.)

Ingredients	*Amounts*
Flour sifted	½ pound
Shortening	2 pounds
Sugar, brown, packed	3 pounds
Salt	1½ ounces
Cinnamon	1 tablespoon
Rolled oats	2 pounds
Peaches, canned, sliced, drained	4 No. 10 cans

Directions

(1) Mix dry ingredients thoroughly.
(2) Place a 1-inch layer of drained sliced peaches in a greased pan and cover with a layer of the oatmeal mixture. Add another layer of peaches and top with a generous layer of oatmeal mixture.
(3) Bake (350° F.) 45 minutes.
(4) *Other fruits such as fresh and dried apples, cherries, or cooked dried apricots may be substituted for peaches.*

b. Applesauce (using dehydrated apple nuggets)

(Yield: 100 ½-cup portions.)

Ingredients	*Amounts*
Apple nuggets, dehydrated	4 pounds (2 gallons)
Water, hot	3 gallons
Sugar	2½ pounds (1¼ quarts)
Cinnamon	½ ounce (2 tablespoons)

Directions

(1) Mix together apple nuggets, water, and sugar. Cover.
(2) Heat slowly, to boiling temperature, stirring occasionally.
(3) Let simmer 1 hour, stirring occasionally. Stir in cinnamon.
(4) A better product is obtained by continuous stirring during the cooking period.
(5) Nutmeg may be used in place of cinnamon, or spices may be omitted.

9. Cooking fresh vegetables

a. Prepare vegetables according to the directions given in the following table.

b. It is desirable to wash vegetables before cooking them. Leafy vegetables should be washed several times, lifting them out of the water each time.

c. Cook in lots *no larger than 10 pounds* of prepared raw vegetable. Simmer vegetables until just tender—no longer than necessary. For a given vegetable, cooking time will differ with variety and age of the vegetable, its size, or the size pieces into which it is cut. See timetable for approximate cooking time.

d. Drain and add 8 ounces (1 cup) of butter or margarine for each 10 pounds of vegetable.

e. A 10-pound lot of prepared raw vegetable makes about 50 3-ounce portions when cooked, drained, and seasoned.

Timetable for Cooking Fresh Vegetables

Vegetable	Preparation	For 10-pound lots of vegetable		Approximate Cooking Time (minutes)
		Boiling Water	Salt	
Beans, lima	Shell. (If possible, scald pods to make shelling easier).	2½ qts.	1 tbsp.	20 to 25
Beans, snap or wax	Trim ends and remove strings. Cut or break beans into 1-inch pieces.	2½ qts.	1 tbsp.	30 to 40
Beets	Remove tops, leaving 2-inch stem on beets. Do not peel or remove root.	To cover	None	60 to 90
Broccoli	Cut off tough stalk ends. Soak in salted water for 30 minutes if insects are present. Drain. Peel stalks. Cut broccoli lengthwise, if thick, to speed cooking.	3 qts.	1 tbsp.	10 to 20

Timetable for Cooking Fresh Vegetables—*Continued*

Vegetable	Preparation	For 10-pound lots of vegetable		Approximate Cooking Time (minutes)
		Boiling Water	Salt	
Cabbage	Remove wilted outside leaves. Quarter and core cabbage.	1½ gals.	2 tbsp.	10 to 15
Carrots	Pare and slice, if desired.	3 qts.	1 tbsp.	Sliced, 15–20 Whole, 20–30
Cauliflower	Remove outer leaves and stalks. Break into flowerets. Soak in salted water for 30 minutes if insects are present. Drain.	1½ gals.	2 tbsp.	15 to 20
Celery	Trim. Cut into 1-inch pieces.	1 gal.	1 tbsp.	15 to 20
Chard, mustard and turnip greens	Sort. Cut off tough stems. Wash several times, lifting them out of the water each time.	Only water clinging to leaves	1 tbsp.	15 to 25
Collards	Sort and trim. Strip leaves from coarse stems. Wash several times, lifting out of water each time. Stir occasionally while cooking.	1 gal.	1½ tbsp.	20 to 35
Corn on cob	Husk. Remove silk. Do not allow corn to stand in water.	1¼ gal. or to cover	1½ tbsp.	10 to 15

Timetable for Cooking Fresh Vegetables—*Continued*

Vegetable	Preparation	For 10-pound lots of vegetable		Approximate Cooking Time (minutes)
		Boiling Water	Salt	
Kale	Sort. Strip leaves from coarse stems. Wash several times, lifting out of water each time. Stir occasionally while cooking.	1 gal.	1½ tbsp.	25 to 45
Onions	Peel. Quarter if large.	1½ gal.	2 tbsp.	20 to 35
Parsnips	Pare. Quarter lengthwise and cut in 3-inch pieces.	1¼ gal.	1½ tbsp.	20 to 30
Potatoes	Cut large potatoes to serving size. peel and remove eyes if for mashing.	1¼ gal.	1½ tbsp.	30 to 50
Rutabagas	Pare. Cut into 1-inch pieces.	3 qts.	1 tbsp.	20 to 30
Spinach	Sort and trim. Cut off coarse stems and roots. Wash several times, lifting out of water each time.	Only water clinging to leaves	1 tbsp.	10 to 20
Squash, Hubbard	If peel is hard and tough, soften it by steaming or boiling whole squash for 10 minutes. Cut; Remove seeds, fiber and peel. Cut squash into pieces.	1¼ gal.	1½ tbsp.	15 to 20

Timetable for Cooking Fresh Vegetables—*Continued*

Vegetable	Preparation	For 10-pound lots of vegetable		Approximate Cooking Time (minutes)
		Boiling Water	Salt	
Squash, summer	Trim. Cut into 1-inch pieces.	2 qts.	2 tbsp.	10 to 20
Sweet potatoes	Select potatoes of uniform size. Cook in skin.	1¼ gal.	None	35 to 50
Turnips	Pare. Cut into 1-inch cubes.	3 qts.	None	15 to 20
Green peas or chick peas	Shell (If possible, scald pods to make shelling easier.)	2½ qts.	1 tbsp.	10 to 20

DEHYDRATED AND DRIED FOODS

General

1. *Dehydrated Foods*
   a. These are fresh foods from which water and the inedible parts such as peels, cores, seeds, and stems have been removed by manufacturing processes.
   b. When stored in airtight, moistureproof containers until ready to be used, dehydrated foods will keep well in moderate temperatures.
2. *Dried Foods*
   a. These are foods from which a part or virtually all of the water has been removed by air, heat or other drying processes. Representative of these are dried fruits, such as raisins, apricots, or peaches; eggs; and cereals, such as ready-to-eat corn flakes, rice and wheat kernels, and brans.
   b. Dried foods do not require airtight and moisture-proof storage to the degree necessary for dehydrated foods. Dried foods, however, must be kept covered and at temperatures that will prevent spoilage.

Preparation

1. Dehydrated foods
   a. Before cooking dehydrated foods, it is necessary to restore to them approximately the same amount of water, through absorption, that was originally removed in the drying process. This restoration process is termed rehydration or reconstitution.
   b. Methods for rehydration and use differ among the various dehydrated food products. Directions furnished by the manufacturer of a dehydrated product should be followed for best results.
   c. Most dehydrated vegetables need to be rehydrated by

soaking in cold water just before cooking. They should be cooked in the water in which they have been soaked in order to retain their water-soluble vitamins and minerals.

d. Cook rehydrated vegetables in as little water as possible and until just tender. Additional seasonings may be needed.

e. Dehydrated packaged soup mixes are nourishing and tasty, and can serve as a base for the addition of fresh or canned vegetables and meat.

f. Dehydrated carrots
   (1) One pound of dehydrated carrots equals 12 pounds of raw carrots as purchased.
   (2) One pound of dehydrated carrots equals 7 pounds of raw prepared carrots.
   (3) Ratio of rehydration is 1 pound of dehydrated carrots to 8 pints of water.

g. Dehydrated potatoes
   (1) One pound of dehydrated potato shreds, julienne, equals 10 pounds of raw unpeeled potatoes.
   (2) One pound of dehydrated potatoes equals 8 pounds of raw peeled potatoes.
   (3) One 5-gallon can dehydrated potato shreds, julienne, weighs 14 pounds and serves 200.
   (4) One No. 10 can of dehydrated potato granules weighs 6 pounds, 2 ounces, and serves 100.

h. Dehydrated onions
   (1) Onions should rehydrate to practically their fresh form when the dehydrated product is barely covered by cold water and allowed to soak for 2 hours.
   (2) Dehydrated onions may be used dry where there is sufficient moisture in the food being prepared, such as in stews or soups.
   (3) In preparing hamburgers, croquettes, or similar foods, onions should be covered with boiling water and soaked for 5 minutes or with cold water and soaked for 20 minutes.
   (4) In using dehydrated onions in recipes where vinegar is also used, onions must be soaked in water first, since the acid in the vinegar retards rehydration.
   (5) Ratio of dehydrated onions.
      (a) One pound dehydrated onion flakes equals 10 pounds onions as purchased.
      (b) One No. 10 can dehydrated onion flakes equals 2½ pounds.

      (c) Ratio for rehydration 1 part dehydrated onion flakes to 8 parts water.

i. Dehydrated apples
   (1) One pound dehydrated apples equals 10 pounds raw apples as purchased.
   (2) One No. 10 can rehydrated applies, pie type, equals 1¾ pounds.
   (3) Ratio of 1 pound dehydrated apples, pie type, to 7 pounds of water.
   (4) One quart dehydrated apples, pie type, equals 8½ ounces.
   (5) One No. 10 can dehydrated apples, sauce type, equals 2¼ pounds.
   (6) Ratio of 1 pound dehydrated apples, sauce type, to 7 pounds of water.
   (7) One quart dehydrated apples, sauce type, equals 11½ ounces.

2. Dried foods

a. Dried fruits

Dried fruits need not be soaked before cooking. Fruit should be rinsed and drained before cooking water is added. Sugar should be stirred in during the last 5 minutes of cooking.

Directions for cooking dried fruits

Fruit	Weight in pounds	Water	Sugar	Method
Apples	9	To cover	None needed. Add 1 ounce to each pound of apples if desired.	Heat to boiling. Cook 40 minutes.
Apricots	9	do	Allow 2 ounces to each pound of apricots.	Heat to boiling. cook 35-45 minutes.
Peaches	9	do	Allow 1 ounce to each pound of peaches.	Heat to boiling. Cook 35-45 minutes.
Prunes	11	do	None needed. Add 2 ounces to pound of prunes if desired.	Heat to boiling. Cook 45-60 minutes.

b. Dried whole eggs

(1) General

(a) Dried whole eggs may be used in place of fresh whole eggs, if care is taken in their reconstitution (liquefying) and cooking.

(b) After reconstitution, they must be treated the same as fresh eggs removed from the shell. They should never be allowed to stand for more than an hour unless refrigerated.

(c) In recipes where dry ingredients are sifted together, dried eggs may be mixed with the dry ingredients. The water required to reconstitute the egg *must* be added to the other liquid in the recipe.

(d) After opening, store unused powder in a tightly covered container in a cool place (not over 55° F.). Refrigerate if possible.

(2) Equivalents

Dried whole egg +	*Water* =	*Large fresh eggs*
2 tablespoons	2-2½ tablespoons	1
1 cup (4 ounces)	1½ cups	10 (1 pint)
1 pint (½ pound)	1½ pints	20 (1 quart)
1½ quarts (2½ pounds)	3¾ quarts	100 (1¼ gallons)

(3) To reconstitute dried whole eggs

(a) The directions for reconstituting should be followed exactly. Eggs may be reconstituted by hand or a mechanical mixer.

(b) Directions:

1 Sift powder before measuring or weighing.

2 Measure correct quantity of powder using standard measure.

3 Pour one-third of the water (cold or lukewarm) into the mixing container.

4 Add all of the egg powder at one time.

5 Blend and beat well to a smooth, thick paste. Add remainder of water and blend.

6 Strain mixture to eliminate lumps. An improvised strainer may be made by punching small holes with an ice pick or nail from the inside outward in the bottom of a No. 10-size tin can.

REFERENCE AND READING LIST ON EMERGENCY MASS FEEDINGS

U.S. Government Publications, Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402

Family Food Stockpile for Survival, USDA Home and Garden Bulletin, No. 77 1961 10 cents

Food Buying Guide for Type A School Lunches. USDA PA 403, 1959 25 cents

Quantity Recipes for Type A School Lunches, USDA PA 631 (card file) $4.00

Recipes for Quantity Service. USDA Home Economics Research Report No. 5, 225 pp., 1958 $2.50

Food Purchasing Guide for Group Feeding. Agriculture Handbook No. 284. 1965 40 cents

Nutritive Value of Foods. USDA Home and Garden Bulletin No. 72, 1960 20 cents

Food for Fitness—a daily food guide. USDA leaflet No. 424, 1958 5 cents—$3.75 per 100 copies

Fish Cookery for 100. Test Kitchen Series No. 1, US Department of Interior, 1950 30 cents

Food Service Sanitation Manual. 1962 Recommendations of the Public Health Service Publication No. 934, 90 pp., — 55 cents

From Hand to Mouth. Public Health Service Publication No. 281 1953 48 pp. 20 cents

Hospital Planning for Nuclear Disaster. Public Health Service Publication No. 1071-G-1., 1965 25 cents

A Consumer's Guide to USDA Services Miscellaneous Publications No. 959 March 1964. A catalogue of bulletins and pamphlets pertaining to service performed by USDA for the consumer

The following sections of the Federal Civil Defense Guide can be obtained from local or State civil defense offices:

Part D Chapter 2, Provisioning Shelters

Part D Chapter 2, Appendix 1, Description, Storage, and Handling of Public Fallout Shelter Supplies and Equipment

Part D Chapter 2, Appendix 4, Fallout Shelter Water Requirements

Part D, Chapter 2, Appendix 6, Fallout Shelter Food Requirements

Part E, Chapter 13, Appendix 1, Emergency Welfare Services Guidelines and Structure

These Red Cross publications may be obtained from your local Red Cross Chapter.

Disaster Action. A chapter manual for Mass Care ARC 1540, July 1959 — 112 pp.
Food for the Disaster Stricken. An informational leaflet ARC 2214 1964
Statement of Understanding Between the American School Food Service Association and the American National Red Cross with respect to responsibilities for disaster planning and Disaster Relief.
Your Community Could Have a Disaster. A chart showing how distinct yet how closely related are the responsibilities of Red Cross and of government in natural disasters. ARC 1570 1966.

Publications of:
The American Hospital Association
840 North Lakeshore Drive
Chicago, Illinois 60611

Principles of Disaster Planning for Hospitals 1956 23 pp. 75 cents
Readings in Disaster Planning for Hospitals 1956 90 pp. $1.50
Checklist for Hospital Disaster Planning, 1963

Miscellaneous:

Nonfat Dry Milk Recipe Cards No. 704 and No. 705 for service of 100.
The American Dry Milk Institute
221 North LaSalle Street
Chicago, Illinois
Coffee for a Crowd, an illustrated folder on quantity brewing from The Coffee Brewing Institute Inc., 120 Wall Street, New York 5, New York

Distribution:

OCD Regions and Staff College.

State and local CD directors
Dept. of Health, Education, and Welfare (Welfare Administration)
American Red Cross

☆ U.S. GOVERNMENT PRINTING OFFICE: 1966—O 222-411