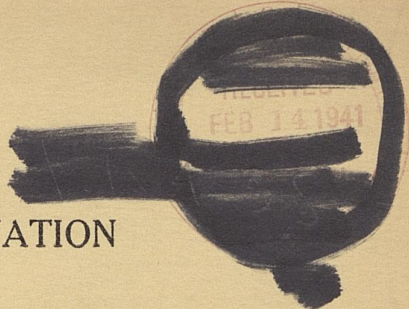


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GARDENING AND FOOD PRESERVATION

CIRCULAR SHOWING THE TECHNIQUE FOR CONDUCTING THE
GARDENING AND FOOD PRESERVATION PROGRAM



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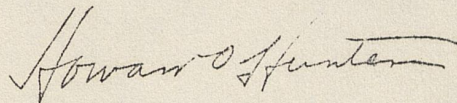
FEDERAL WORKS AGENCY
WORK PROJECTS ADMINISTRATION
Division of Community Service Programs
Washington, D. C.

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FOREWORD

This circular provides a suggested operating technique for gardening and food-preservation projects. The procedure presented herein is not mandatory. Local conditions and special requirements may necessitate some changes.

This procedure relates only to the general techniques of project operation. Nothing in this circular is to be construed as affecting or modifying in any way administrative procedures of the Work Projects Administration.



Howard O. Hunter
Acting Commissioner of Work Projects

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Preface

The WPA gardening and food preservation program is an outgrowth of gardening and canning projects operated under the Civil Works and Federal Emergency Relief Administrations. Initiated during the earliest days of the Federal work program in response to an urgent demand for food for needy families, the projects have become an increasingly important part of the community service program of the Work Projects Administration.

The objectives of the program remain unchanged; namely:

1. To provide useful work for needy people.
2. To provide supplementary food for the needy.

However, as the program developed, its interpretation has broadened to include the production of food for needy children in schools, on playgrounds, and in camps, and for needy persons in public institutions as well as for needy people in their own homes. Gardening and food preservation in connection with school-lunch projects have become a particularly important phase of that program.

In the operation of projects, increased emphasis has been placed on better methods of organization, better equipment, and new and improved techniques to increase the effectiveness of the work. Small gardens in isolated areas have been replaced in many instances by consolidated units which make possible more adequate supervision and better equipment. The same is true of canning units. Where such consolidation has taken place, costs of operation have been reduced, the quality of the product improved, and production increased.

Greater attention is being given to the variety of foods produced, as well as to the total amounts. The time of planting is being spaced so that a continuous supply of fresh vegetables may be available throughout the year where climatic conditions permit. Winter gardens in protected frames make it possible to have fresh produce at all seasons in some areas.

Although canning largely takes precedence over other methods of food preservation, the processes of storing, drying, and brining are being utilized effectively in many instances. The latest trend is toward quick freezing, the most recently developed method of food preservation.

The purpose of this circular is to assist in the development of high standards of operation for gardening and food preservation projects, rather than to give detailed instructions for all the technical processes involved.

Such projects may operate separately or as combined projects, or either one or the other, or both, may operate as a part of the school-lunch project. In all instances there are certain fundamental principles of operation common to both programs. Such questions as sponsorship, advisory committees, community needs and facilities, supervision, and training are discussed in this manual from the point of view of both projects. Separate sections of the technical aspects of each project are also provided.

GARDENING AND FOOD PRESERVATION

PART I. PRELIMINARY PLANNING.

Section 1. Conditions of Operation. A WPA gardening and food-preservation project may include the production and preservation of foodstuffs for distribution to needy people, to tax-supported institutions caring for the needy, and to other WPA projects, such as school-lunch projects, nursery schools, household workers' training projects, and camps serving needy and/or malnourished children.

Such a project may also provide supervision for community gardening and/or food-preservation centers where all nonlabor costs are furnished by the sponsor. In such instances the WPA supervisor shall be responsible to the sponsor for the operation of the project, and to the Work Projects Administration for its technical adequacy. In accordance with Operating Procedure No. G-1, section 8, a ratio of 1 WPA worker to not less than 10 or more than 25 people using the center shall be maintained. The supervisor shall not engage in the actual work of production.

A Community Food-Preservation Center Program is suggested as a substitute for "toll" canning. Such a program provides adequate facilities furnished by the sponsor and trained supervision by the Work Projects Administration. According to the plans of the sponsor, persons in the community may bring their own garden produce to the center and preserve it in whatever form may be desirable.

This plan permits the sponsor to furnish materials and supplies according to the needs of the participants and to determine the amounts, if any, of the furnished produce to be retained by him.

Before a WPA supervisor may be supplied to a community food-preservation

project, the sponsor shall submit a plan indicating adequacy of available space and equipment, an estimate of the number of persons who will utilize the center, the type of work to be performed, and the duration of time for which the supervisor will be needed.

Gardening and food-preservation projects may also provide technical assistance in gardening and food preservation to other WPA projects.

Section 2. Sponsorship. Gardening and food-preservation projects are sponsored by Departments of Education, Departments of Public Health, Departments of Public Welfare, or other public agencies, either State or local as the case may be, legally authorized to prosecute such work according to regulations set forth in Operating Procedure No. G-2. A gardening and food-preservation project operated primarily to produce food for a school-lunch project usually has the same sponsorship as the school-lunch project. While this is not a requirement, it facilitates the necessary coordination of activities.

Normally the sponsor should furnish space, utilities, equipment, and supplies. The necessary items include the following:

1. Sufficient acreage to produce the crops required.
2. Farm machinery and equipment necessary for efficient gardening.
3. Seeds, fertilizer, insecticides, and other materials needed for the planting and care of the crops.
4. Adequate and safe storage space for fresh and canned garden produce.
5. Adequate space, utilities, equipment, and supplies for canning and for other processes to be used in preserving the foods.
6. Transportation of produce from garden to cannery or warehouse.

The legal sponsor usually secures co-sponsoring agencies to assist in discharging these responsibilities. These may be any local organizations or groups interested in the objectives of the project, such as Parent-Teacher Associations, service clubs, church organizations, and lodges. Since all products become the property of the official sponsor, their distribution is also his responsibility.

Section 3. Advisory Committees. In order to serve a community most effectively, a WPA gardening and food-preservation program must be integrated into the community life. To this end, the State Director of Community Service Programs should be instrumental in bringing about the formation of advisory committees, both State and local, which will function in the planning of the program and help in the solution of special problems involving community relationships.

Members of the committee should be civic-minded persons who are outstanding in their communities, who possess qualities of leadership, and who have a real interest in furthering the objectives of the project. Where gardening and food-preservation activities are closely related to those of the school-lunch program, the same advisory committee often serves both projects. The committee should include representatives of the sponsoring agency, co-sponsoring groups, other professional and lay organizations, and interested individuals.

Responsibilities of an advisory committee may include assistance in planning the program to meet community needs, interpreting the program to the community, and obtaining financial support and donations of garden surpluses. The use of technical assistance that can be secured from professional persons who may be members of an advisory committee should not be overlooked. Home Demonstration Agents, County Agricultural Agents and other agriculturalists, and vocational teachers have done much to assist in establishing technical standards and developing and carrying out training programs.

Advisory committees should meet regularly and have a carefully planned program in order to do effective work.

Section 4. Survey of Community Needs. The value of a gardening and food-preservation program to a community is in direct proportion to the local need for such service. Therefore, in planning a project it is important to have specific information about local conditions in order to determine the extent and type of service to be given. Through the advisory committee, in cooperation with welfare agencies, schools, and other interested organizations, the following facts should be obtained:

1. Number of needy families in the community lacking sufficient food or sufficient variety of food and unable to secure these requirements from other sources.
2. Needs of school-lunch, nursery-school, and other WPA projects eligible to receive food from the gardening and food-preservation project.
3. Number of needy persons in public institutions requiring supplementary food to maintain good dietary standards.
4. Total number of persons who would benefit by the program, approximate age groups, condition of health, and varieties of produce most needed to supplement their diets.
5. The extent of community cooperation which may be expected.

Section 5. Survey of Community Facilities. Before a gardening and food-preservation project is organized, it is necessary to have assurance that adequate facilities for efficient operation will be available. The preliminary planning should include a survey of the community to discover existing facilities that may be utilized.

A. Available Acreage for Gardening. While the trend is toward larger gardens, the possibilities offered by small tracts of land should not be overlooked. Two or three acres, if properly planted and cared for, will yield a large amount of produce. Smaller garden plots will, in many instances, supply sufficient vegetables to meet the needs for fresh produce and give some surplus for canning as well. County Agents of the State Extension Service and Agricultural Adjustment Administrators should be consulted about the availability of fertile idle acreage.

In many communities there is unused land which can be had for the expenditure of well-directed effort. Vacant lots that grow up in weeds every summer are common in many towns. Land cut through by a stream is sometimes left uncultivated because it is inaccessible and not adapted to large-scale farming. It is often fertile and suitable for cultivation with small equipment. Owners of such land may be willing to have it used for WPA gardens.

Cities with no available land for gardening may operate a garden outside the city limits or cooperate in a county consolidation plan to share a garden and cannery. Many public bodies have bought land and are making permanent gardens.

B. Space and Equipment for Canning. Unnecessary expense may be avoided by giving full consideration to facilities already available in the community before any investment in a cannery or equipment is made.

Commercial canneries that have discontinued operation exist in some communities and may prove suitable for a WPA canning unit. However, since such a cannery may have a production capacity far greater than is needed, the costs of operation and overhead should be carefully considered in relation to the desired production.

Old buildings having concrete floors, running water, good ventilation, and other facilities needed for canning are found in many communities. These can often be made into safe and efficient canning units at very little cost.

Used steam boilers and steam pipes can sometimes be found and can be purchased at a small fraction of the original cost. Such equipment should

be inspected and approved by the WPA State Safety Consultant before it is accepted. Boilers should be large enough to produce the required volume of steam, but not so large that they are expensive to operate.

In some instances where canning units operate in school buildings during the summer months, the steam boiler of the school heating system has provided a safe and economical means of furnishing steam for canning retorts. Steam from school boilers has also been used to increase production where a fully equipped steam unit is neither practical nor desirable. Such boilers should be checked for safety and for adequacy of volume of steam.

Exhaust boxes can often be made at a lower cost than the price of commercial equipment.

Tables required for preparing and packing food can be made at small cost. In some schools manual-training classes have constructed tables from materials furnished by the sponsor.

C. Possibilities for Quick Freezing. If quick-freezing and cold-storage facilities are available in a community, the possibility of using the freezing method of preserving garden produce should be investigated and the cost checked against the cost of canning. In some instances it may prove less expensive and more satisfactory than the operation of canneries.

D. Transportation Facilities. Facilities available in the community for transporting garden produce to canneries or other processing centers or to storehouses should be considered in the initial planning for a gardening and food-preservation project. It is important that arrangements for trucking service be made before the garden is planted, not after the crops are ready for harvesting or have been harvested.

Where county-wide or large urban units are operated, it is often possible to secure part-time use of a truck maintained from public funds. For small units it may be necessary for co-sponsors to arrange for a local truck or teamster to make deliveries from garden to cannery.

Schools sometimes maintain a truck that can be made available when needed to transfer vegetables from the garden to the school or cannery.

Under certain circumstances it may be deemed advisable to provide transportation by trucks maintained from WPA funds. This would depend upon local conditions and would be determined administratively by the State Director of Community Service Programs.

E. Storage Space for Root Crops and Canned Goods. Root crops for storage should not be planted unless acceptable plans for storage have been made. Local County Agents, school agricultural departments, or

successful farmers should be consulted as to the best methods for storing crops in any particular locality. Arrangements for the necessary facilities should be included in the original garden plan.

Suitable storage space for canned goods is also necessary. When several schools consolidate their canning activities in one unit, a central warehouse may be used where canned food is stored and checked out to schools as needed.

Section 6. Integration With Other Programs. The gardening and food-preservation projects, whether they are operated as part of the school-lunch program or as separate projects, should be integrated with other programs carrying on similar work. Information on methods and standards as well as technical assistance in gardening and food preservation may be extended to WPA recreation, housekeeping aide, household workers' training, and education projects which engage in these activities. Close contact with agencies such as the State Extension Service, Agricultural Adjustment Administration, and Farm Security Administration should be maintained. The accurate technical information available from these agencies should be used in setting standards and their assistance secured in maintaining a high standard of production.

PART II. PROJECT PERSONNEL

Section 7. Supervisors. The organization of a ~~State-wide~~ project may provide for State, district, area, county, and unit supervision according to the extent and size of the program.

Supervisory personnel must be selected in accordance with requirements set forth in Operating Procedure No. E-9, appendix B, section 5. General duties performed by all supervisors should be in accord with those given in job descriptions in Operating Procedure No. E-9, appendix B, section 5. Specific duties should be planned administratively by the State Director of Community Service Programs.

Where projects are combined, technical supervisors for each phase of the project should be assigned as assistants to the State supervisors if the size and extent of the program will permit. A technician with experience in canning on a production scale with commercial-type equipment is necessary where large steam canneries are operated.

Since the success of a project will depend largely upon the ability of the supervisor as a leader, the following general qualifications should be looked for in all supervisors regardless of level:

1. Executive and administrative ability with an understanding of and appreciation for the program.
2. Ability to direct others as well as to follow directions.
3. Enthusiasm, initiative, and good judgment.
4. A pleasing personality and ability to establish and maintain harmonious working relationships with others.
5. Ability to meet emergencies with poise and self-confidence.

It is important that every canning unit, however small, be closely supervised by a technically qualified person. In order to find such a person, all community sources should be thoroughly explored. A former Home Demonstration Agent or canning technician who is a resident of the community in which the unit is to operate may be available. These persons usually have the desired training and experience, and also know how to use local resources.

Trained persons with the special ability needed for supervising food-preservation or gardening activities are sometimes found on other projects. A check should be made with the Employment Division to discover these persons.

Section 8. Project Workers. Workers should be assigned to gardening and food-preservation projects as foremen, gardeners, laborers, canners, or helpers, in accordance with the regulations set forth in Operating Procedure No. E-9. Large units may require the employment of workers in other classifications, such as clerks, typists, firemen, and truck drivers. Assignments should be made in accordance with the organization plan and the types of work to be performed.

Women may be assigned to garden projects at the discretion of the State Director of Community Service Programs and according to the policy of the State.

PART III. HEALTH AND HYGIENE

Section 9. Medical Examinations. Arrangements for medical examinations of workers on food preservation projects must be made in accordance with Operating Procedure No. G-5, section 8.

Section 10. Health Protection for Workers. Adequate protection against wet floors, light glare, and overheating should be provided for workers in canning units. A thermometer should be available for registering room temperature of working areas and the temperature checked regularly.

Local health officers should be asked to make periodic inspections of food-preservation centers and assist in the establishment and maintenance of high standards of health and sanitation.

A standard first-aid kit shall be maintained at each gardening and canning unit, and the services of a person certified as competent to administer first aid shall be available to all workers. All injuries sustained by workers while in line of duty shall be reported in accordance with prescribed procedure.

A sanitary drinking fountain or individual paper cups for drinking water for the workers shall be provided in accordance with WPA safety regulations. The use of a common dipper, cup, or glass shall not be tolerated.

Section 11. Personal Hygiene. Absolute cleanliness of person and clothing is essential for all food handlers and is required of workers on food-preservation projects. The workers should be impressed with the importance of daily bathing and daily change of underwear. Good grooming should also be required. A well-groomed appearance increases the workers' self-confidence, helps them develop a professional attitude toward their work, and presents them favorably to the public. The hair must be covered at all times. Men should wear close-fitting caps of washable material. Women may wear caps or nets as preferred.

Workers who have colds should not be on duty in a food-preservation units.

The use of paper tissues in place of handkerchiefs is desirable. These should be provided by the sponsor, if possible.

Section 12. Uniforms.

A. Uniforms for Food-Preservation Workers. In accordance with Operating Procedure No. G-5, section 8, workers on food-preservation projects are required to have a minimum of three uniforms. However, since the nature of the work necessitates a fresh uniform every day, five uniforms are preferable to allow adequate time for laundering.

Uniforms for men should consist of trousers, jumper, cap, and butcher's apron. The material for men's uniforms should have sufficient body to be absorbent and sturdy. Materials such as duck or drill are more suitable for men's uniforms than lighter-weight fabrics.

The uniforms for women should consist of a dress and work apron; a cap may be included if preferred to a hair net. The dress should be a closed model, not "wrap around," made comfortably loose through the shoulders and arms to permit free body action. Sleeves may be short or long according to State recommendations. If buttons are used as fasteners, both buttons and buttonholes must be kept intact. The use of pins for fasteners should not be permitted. A satisfactory uniform for women workers has been developed by the Colorado State-wide sewing project. A sketch of the uniform and a diagram of the lay together with directions for construction appear in appendix a of "Operation of School Lunch Projects," WPA Welfare Circular No. 1.

The work apron should be made with a bib sufficiently wide to protect the front of the uniform and should be full enough to protect the sides of the dress. The cap should cover the hair completely.

The laundering of uniforms should also be a part of the sponsor's contribution but may be made the responsibility of the worker. The use of white uniforms for both men and women is recommended since they may be easily laundered. Colored uniforms often fade from continual laundering and are then unattractive in appearance.

Supervisors of food-preservation units should be required to wear uniforms when assisting workers and when inspecting the preservation of food. Field supervisors and visitors should be provided with slip-on uniforms if observations are made in actual contact with food. The material and style selected for uniforms to be worn by supervisors should conform to the accepted standards of those for workers. They may be distinctive in color but should be practical and conservative.

B. Clothing for Workers on Gardening Units. Workers on the gardening phase of the project are not required to wear uniforms. However, they should wear washable garments which are appropriate and comfortable for gardening activities.

PART IV. TRAINING AND INSTRUCTION OF PROJECT PERSONNEL

Section 13. Planning a Program of Training for Supervisory Personnel and Instruction for Project Wage Employees. Training for supervisory personnel at all levels on the gardening and food-preservation project is essential to effective project operation. It should be a part of the State-wide training program for the Division of Community Service Programs. Although project workers are assigned to occupations for which they are generally qualified, they will require preliminary instruction in the work to be done and in methods of project operation. The efficiency of project operation will also be facilitated by development of a planned program of instruction and guidance for workers throughout the period of their employment.

The over-all planning of the program of training and instruction for project personnel should be done from the State office by the Chief of Welfare Programs in cooperation with the State Supervisor of Training and the State supervisor of the gardening and food-preservation project. This centralization of planning should result in:

1. Standardization of methods of instruction
2. Uniformity of project operation
3. High standards of project operation

Centralization of basic planning should not relieve the district, county and unit supervisors of definite responsibility regarding specific planning. Details cannot be worked out in the State office, yet if details are excluded from a plan, the plan will be ineffective. Adjustments and adaption of a broad plan made by the State office to fit local situations will be necessary in all instances.

Section 14. Training Supervisors. Workers cannot be successfully trained unless a State has a well-planned training program for supervisory personnel. Training for gardening and food-preservation project supervisors should be included in the State-wide plan of training for supervisors on all projects of the Division of Community Service Programs and may be a part of training conferences for supervisors of other welfare projects.

This training may be given on a State-wide, district-wide, county-wide, or city-wide basis, depending upon the size and organization of the program.

Many States have found the following plan to be successful.

District or area supervisors of the project are assembled with District Directors of Community Service Programs on a State-wide basis for a training institute of from 3 to 4 days with the State Supervisor of Welfare Programs, the State Training Supervisor and the State Technical Supervisor of the project.

Each District Director of Community Service Programs, with the assistance of the district or area project supervisors, follows this institute with a district-wide training meeting of approximately the same length of time for county project supervisors. These might be sectional meetings for county project supervisors, or they might be sectional meetings of district-wide conferences in foremanship training. The State Technical Supervisor and the Supervisor of Welfare Programs should participate in some of these meetings in each district in order to maintain high standards of training and to assist in the evaluation of the meetings.

County supervisors in turn follow up with group training of unit supervisors and workers as outlined in section 16.

District project supervisors should participate at these county meetings as often as possible, and the State supervisor of the project should attend such meetings occasionally in order that supervision from the State office may reach unit supervisors.

The frequency with which the training meetings are held will vary with different States, depending upon local limitations. It is recommended that the meetings of State-wide

scope be held 2 to 4 times a year. That the district meetings be held 4 to 8 times a year and the county or city meetings be held 8 to 12 times a year.

The same methods employed in training project workers may also be used for supervisory training; that is, demonstration, group discussions, and individual conferences. In addition to these methods, panel discussions, symposiums, and lectures may also be used for effective teaching of supervisors.

The following are suggestive of the subjects to be covered in training supervisory persons:

1. Methods of teaching.
2. Technical subject matter with special emphasis on its adaption to the WPA gardening and food-preservation project.
3. Organization, purpose, mechanics, and activities of the WPA program.
4. Improved project operation through organization and plan of work.
5. Safety education.
6. Sanitation standards.
7. Personnel management.
8. Sponsorship relations.
9. Public relations.

Section 15. Instruction for Gardening Activities. Improved gardening techniques will be the result of instructing workers in the best methods of gardening.

Instruction for gardeners should be given by agriculturists who may be supervisors or foremen of the gardening project. If these persons are not available from the project, the assistance of local agriculturists should be sought in giving the instruction.

Both preliminary and continued in-service instruction for gardeners should be included in the program. The instruction will usually be given on the job.

The method of assignment of workers necessitates that the period of preliminary instruction be a short one. The time allowed is usually from 2 to 5 days during the first week after the worker's assignment to the project. Supervisors and foremen should have definite plans for the instruction to be given during that time.

The following should be considered as minimum essentials to be covered:

1. Organization, purpose, mechanics, and activities of the project.
2. Use and care of garden equipment.
3. Preparation of seed beds for planting.
4. Use of fertilizers, amounts to use, how to distribute, etc.
5. Methods of planting seed.
6. Recognition of garden pests and how to control them.
7. Cultivation of garden crops.
8. Harvesting of garden crops.

Section 16. Instruction for Food-Preservation Activities. In order that project employees on the food-preservation project may be prepared to meet more successfully the specific problems encountered on their projects, they should receive additional instruction for the particular job of preserving food. This instruction should be related to the abilities of the employees and to the requirements of their duties. It should be based upon the simplified application of technical material, with the objective of instructing the employees primarily in the fundamental principles and methods of food preservation. If the instruction is geared to a level beyond the workers' grasp, it will not be applicable to their particular jobs.

A. Methods of Instruction. The most effective learning of unskilled workers occurs through a combination of watching, listening, and doing, with emphasis on the doing. The most effective methods of teaching these workers are in order of their importance.

1. Demonstration or work-shop method.
2. Group discussions.
3. Individual conferences.

1. Demonstrations. The major portion of the instruction should be given on this basis since through this method the workers practice doing something they have watched the supervisor do. In other words they are actively engaged in a work-shop procedure. The demonstration method of teaching should not be interpreted to mean that workers only watch a supervisor give a demonstration. In this manual, "Demonstration Method" is used to imply that after a supervisor gives a demonstration, workers must repeat the demonstration on an individual basis. This is necessary in order that they carry the demonstration over successfully to their own jobs. For example: If a supervisor gives a demonstration on canning string beans, then each worker must actually can string beans if she is to acquire the necessary degree of skill for repetition of this process on the job. Because of the time required for a demonstration it may not always be possible for a supervisor to complete all processes pertaining to the subject being presented. It may be necessary to confine the demonstration only to essential steps needed by the worker to carry out the demonstration successfully. For example, in a demonstration of canning string beans the supervisor may demonstrate to the group the following steps:

- (a) The washing and cutting of the beans.
- (b) Blanching the beans.

- (c) Filling the cans.
- (d) Exhausting the cans.
- (e) Using the sealer and pressure cooker.

After the workers have observed the supervisor's demonstration of these essential steps, the foremen should be assigned to carry out the demonstration, completing processes for the finished product. The helpers would repeat that part of the operation for which they are employed. For example, some workers may be employed to wash and cut beans while others may be employed to fill cans. The activity of all workers should be under the direction of the supervisor.

In planning instruction by the demonstration method the following points should be taken into consideration:

- (a) This method of teaching should be employed in all phases of instruction requiring activity; that is, preparing, and processing foods, cleaning and caring for equipment, etc.
- (b) Demonstrations should be planned to fit specifically one of these activities of the food-preservation projects.
- (c) The demonstration should always be presented on a project location.
- (d) Commercial canning demonstrations can be very helpful in this method of teaching.
- (e) Certain activities will permit the grouping of workers so that two to four workers may be engaged in one activity--such as labeling or storing of canned products.
- (f) At the conclusion of each demonstration a careful evaluation should be made. The entire group should participate in this evaluation.

2. Group Discussions. In order that this method of instruction be effective and interesting it is suggested that the following points be taken into consideration:

- (a) A careful plan for the discussion must be made by the supervisor or the leader of the discussion. This plan should be detailed to the extent of listing all leading questions and must include possible solutions to problems which will grow out of the discussion.
- (b) The group should number between 8 and 15. A large group prevents individual participation.

- (c) The subject under discussion must be one which is pertinent to the entire group.
 - (d) An hour is the maximum length of time to expect a group of workers on this project to be interested or participate in a group discussion.
 - (e) The discussion must be summarized by the leader. If the discussion is worth-while definite conclusions can be drawn.
 - (f) Interest is added to discussions through wisely chosen illustrative material.
 - (g) The discussion will be more successful if the group is sitting around a table rather than in chairs arranged in rows.
 - (h) Workers should not be expected to take notes on the discussions or to copy material from a blackboard. Material to be used by workers should be typed or mimeographed and distributed to them.
 - (i) The discussion should be kept on an objective basis and workers should not discuss personal problems.
 - (j) Suggested topics for group discussions:
 - (1) Analysis of work to be done
 - (2) Work schedules
 - (3) Personal grooming
 - (4) Safety
3. Individual Conferences. This method of instruction can be very constructive. It will ordinarily be used for project foremen. Since the conference method is expensive and time consuming it should seldom be used for individual helpers on projects. The following suggestions may prove helpful:
- (a) Individual conferences should be a planned part of the program of instruction. They should be scheduled ahead so that preparations can be made by both supervisors and workers.
 - (b) The supervisor should determine the specific purpose of the conference and notify the worker of the purpose so that the time will be spent to the best advantage.

- (c) A hurried impromptu visit with a project worker should not be considered by the supervisor as a substitute for the well-planned individual conference.
- (d) Records of conferences should be maintained so that follow-up conferences may be planned.
- (e) Results of the conferences should be evaluated by administrative and technical supervisors so that techniques may be improved.
- (f) Suggested topics for individual conferences:
 - (1) Management of time
 - (2) Organization of reports, records, etc.
 - (3) Sanitation problems

B. Preliminary Instruction. The assignment of workers to the food-preservation project should be made from 2 to 5 days before they are assigned to duties in the canning unit. This time should be devoted to intensive preliminary or "threshold" instruction. This instruction is particularly important where foremen and intermediate workers are concerned since they have little conception of the responsibility involved in the job to be done. The importance of the responsibility of these workers cannot be overemphasized, and the preliminary instruction period is considered essential in order to help them meet this responsibility. It may be necessary to forego preliminary instruction for helpers.

The preliminary instruction will ordinarily be a regular part of project operation since new workers are continually being assigned. Wherever possible, workers should receive this training at the project locations where they are to work. Otherwise, it should be given at the most convenient location of a food preservation project.

C. In-service Instruction. Workers on the food-preservation project may receive in-service instruction on the job at their particular project location or they may be brought together in groups on a city-wide, county-wide, or district-wide basis to a centrally located project for a training period of from 4 to 8 hours.

In planning for the latter it is important to limit the size of the group. It is suggested that 15 workers be the maximum number assembled for group instruction. In some localities this will mean that within the city, county, or district, several group meetings will be needed in order to reach all workers. Since the instruction of workers should be done on project time it will be necessary to schedule workers so that they may accumulate the hours needed for the group meetings. This type of in-service instruction should be given once a month wherever it is possible to assemble workers.

1. Instruction on the Job. When the instruction of food-preservation workers is done on the job it is done under natural and informal conditions and therefore can be very effective. In some localities the major portion of training on this project must necessarily be done in this manner through field visits made by the district, area, or county technical supervisors. These visits must be well planned by the supervisor and be of sufficient length to insure giving the workers definite instruction in the jobs to be done. It is important that supervisors be appropriately dressed. If it is not practical to wear uniforms on field visits, then supervisors should carry a uniform with them to put on after arriving at a unit. Unless a supervisor is properly dressed for the job, workers may become careless in their manner of dress.

Following are suggestions for the type of instruction which should be given on the job:

- (a) Organization and Management of Work. It may be necessary for the supervisors to sit down with a foreman and make out a plan of work, either for the entire day or for one specific job. If it is a specific job the supervisor should remain at the unit until the job is completed in order that she may assist the foreman in evaluating the work plan.
 - (b) Preparation of Food for Canning. All workers need instruction in preparing food for canning. A supervisor can teach time and labor-saving methods of preparing fruits and vegetables by using for demonstration the preparation of some of the food to be canned; for instance, cutting a number of string beans at one time on a board instead of cutting them one by one.
 - (c) Housekeeping. Workers need instruction in organizing and cleaning storerooms and in keeping floors and working surfaces clean. Supervisors should demonstrate to workers how improvements can be made through better housekeeping.
2. Instruction in Groups. When workers are assembled for a day of group instruction it is important that the day be carefully planned. The following suggestions are given for making the plan:
 - (a) The day should include both group discussions and demonstration, and all workers should be scheduled to participate in both.
 - (b) It may be advisable to divide the group after a general presentation of the subjects to be covered, so that a portion of them are engaged in a group discussion, while others are engaged in food-preservation processes. The groups should exchange at a specified time so that at the end of the day each worker will have participated in the various activities.

- (c) Where a district and county supervisor or a county and unit supervisor are giving the instruction, one supervisor should lead the discussions while the other supervises the demonstrations of the workers. If only one supervisor is present it will be necessary that she supervise the several groups. If a careful plan has been made and presented to the group, a supervisor can successfully direct several activities. Care should be taken not to oversupervise since this tends to prevent workers from developing self-confidence.
- (d) This instruction should be given by technical supervisors of the food-preservation project. Dependent upon organization this may be the city, county, area, or district supervisor. Full use should be made of assistance available from technical persons in the community; however, these persons can usually be used to better advantage in supervisory training.

D. Content of Program of Instruction. Following are minimum essentials to be covered:

1. Preliminary.

- (a) Interpretation of the project.
- (b) Personal hygiene and sanitation.
- (c) Methods and procedures of canning.

In the short period allowed for this instruction it will be impossible to cover the above topics comprehensively. However, the time should be scheduled so that workers receive some elementary instruction in each subject. The same topics should be expanded for in-service instruction.

2. In-service

- (a) Organization, purpose, mechanics, and activities of the project.
- (b) Personal hygiene and sanitation.
- (c) Safety education.
- (d) Housekeeping on food-preservation projects.
- (e) Management of time and energy.
- (f) Care and use of equipment.
- (g) Methods and procedures of canning for quality and quantity production.

PART V. GARDENING

Section 17. Technical Assistance From Local Sources. Since many factors that affect a gardening program are variable, depending on local soil and climatic conditions, use should be made of information available from technically trained State and local agriculturalists. United States Department of Agriculture Experiment Stations are maintained in many localities and are a good source of technical help. Reports and studies on soil, seasons, crops, varieties, and quality of produce can be secured through the Agricultural Adjustment Administration and other governmental agencies dealing with agricultural problems and from State Universities and State Agricultural Colleges. County agents of the State Extension Service know local crop conditions and the difficulties encountered in gardening in almost every section of a State and are usually willing to cooperate in developing a WPA garden program. Successful truck gardeners and farmers are among the residents of a community who are qualified and willing to give advice and assistance.

Section 18. Selection of Crops. The selection of crops to be planted is a matter to be determined by the local situation. However, one guiding principle holds for all gardening units: determine the needs for garden produce before deciding on what to plant. To do this it is necessary to know who will use the produce, when it will be used, and in what form.

Careful consideration should be given to the nutritive value of the produce to be raised. In general, emphasis should be placed on green and yellow vegetables and tomatoes, for these contain nutritive elements that are likely to be lacking in the diets of underprivileged families.

In order to make the best possible use of the available acreage, varieties of crops which will yield a maximum amount of foodstuff should be chosen.

Where it is anticipated that gardening projects will be operated on the same ground for a period of years, it may be advisable to include perennial plants such as rhubarb, asparagus, strawberries, and herbs.

Section 19. Year-around Gardening. The operation of gardening units on a year-around basis should be considered wherever practicable in order to provide fresh produce at all seasons and to permit more efficient use of labor and equipment on canning units. In planning for year-around gardening where produce is to be used fresh, consideration should be given to staggered planting to insure a good variety of green vegetables as well as root crops at all times. Gardens planted principally to supply produce for canning should be planned so that production will be in line with facilities for preserving the products.

Where year-round gardening is not possible, the use of hot beds and cold frames should be encouraged to provide seedlings for early planting and for year-round production of such items as lettuce, radishes, and spinach for use by small school-lunch projects.

Section 20. Planting and Cultivation of Gardens. For successful gardening, land that is productive or that can be made productive must be provided. If produce is to be canned, the garden should be near enough to the cannery to permit deliveries within a few hours after harvesting. Provision should be made to protect the garden from invasion by farm animals.

The sponsor is responsible for the plowing of the land and initial preparation of the soil and should furnish the equipment necessary for this work.

The following points should be considered in planting and cultivating gardens.

1. Soil should be analysed before planting is done in order to determine its adaptability to the various crops desired and the treatment necessary to make it productive.
2. Fertilizers should be used as required to increase the mineral content of the soil. Directions for applying fertilizer should be followed closely. If carelessly used, it may be worthless or even harmful.
3. Seeds and plants should be selected from varieties best adapted to the soil and to the locality. Varieties which can be expected to give high production should be chosen. Seed of good quality is necessary for a good yield of high-quality produce.
4. Planting should be carefully planned in order to produce the largest possible amount of food on a given acreage. Gardens should be planted as early in the spring as weather permits in order to take full advantage of the growing season. Late planting cuts production, thereby increasing unit costs.
5. No more seed should be planted at one time than is needed for the amount of produce that can be used or preserved at maturity. However, some allowance

should be made for the possibility of lowered production because of weather conditions which may decrease yields. Successive plantings at 10- to 14-day intervals will help assure a continuous flow of produce throughout the season.

6. Short-season crops should be planted together, so that after they are harvested others may be planted in the same space. It may be desirable to plant second crops between rows of first early crops.
7. Since the best yield is obtained when neither too much nor too little seed is used, directions for planting should be carefully observed. A well-pulverized seed-bed is necessary in all instances.
8. Rows running north and south give more rapid growth of crops because the plants do not shade one another. The vegetables should be planted so they will not shade shorter ones.
9. After the garden is planted, workers should be assigned and hours scheduled to provide proper care for the growing crops at all times.

Section 21. Harvesting and Distribution of Garden Produce. All garden produce should be harvested at the best stage of maturity for tenderness, flavor, and color; that is, when it is fully grown but not overripe. Berries, soft fruits, tomatoes, and leafy vegetables should be handled with special care to prevent damage.

Vegetables supplied to canning units should be picked early in the morning so that they may be canned the same day. Trucking service should be carefully scheduled, since it is important that the harvested produce be transported with the least possible delay to canneries, storage warehouses, or distribution centers.

Careful planning by the sponsoring agency responsible for distribution is necessary to avoid loss by spoilage of perishable items which are to be used fresh. A definite agreement as to deliveries to school-lunch and canning projects should be made with the sponsor so that the operation of these projects will not be interrupted by delays in receipt of produce.

Part VI. CANNING

Section 22. Physical Set-up of Canning Unit. Adequate space and proper equipment are fundamental to the efficient operation of a canning unit, as they are factors which to a large extent control production costs and the quality and safety of the product. A canning program should not be attempted without suitable physical facilities.

A. Types of Canneries. Where large-scale production is planned, it is recommended that canning units be set up and equipped to conform to the standards of commercial canneries. This type of operation requires stationary retorts, vats, and exhaust boxes operated on a steam line, and power-driven automatic sealers.

Small canning units, established to take care of produce from small local gardens, may use portable equipment of the home-canning type. This type of cannery requires pressure cookers operated by direct heat from a coal, gas, electric, or oil stove, and hand-operated sealers.

B. Building and Space Requirements. The building in which a canning unit is located should meet all safety and sanitary regulations in force in the community. Before it is put into use it should be inspected and approved by a WPA Safety Representative in accordance with prescribed WPA regulations.

Space must be sufficient to accommodate all equipment and allow for carrying on the work in an efficient manner. In determining the amount of space required it is necessary to consider the following activities:

1. Receiving produce
2. Preparing produce for canning; washing, paring, slicing.
3. Blanching or precooking.
4. Filling cans.
5. Exhausting.
6. Sealing cans.
7. Processing.
8. Cooling.
9. Labeling.
10. Washing and sterilizing utensils.
11. Storing cans and canned goods.
12. Keeping records.

It is desirable, particularly on large projects, to have separate rooms for receipt of incoming produce and for storage.

1. Storage Space. Space at room temperature (about 70 F.) should be provided for holding canned goods for a period, at least 10 days.

This is necessary in order that cans may be checked for spoilage. For permanent storage a lower temperature is desirable. The room should be dry, and the temperature and humidity fairly constant to prevent rusting of tin cans. Food canned in glass jars should be stored in a dark room to prevent loss of color.

2. Dressing rooms Rooms where the workers may change from street clothes to uniforms, and adequate toilet and lavatory facilities for men and women workers, are necessary. Lockers or racks for hanging street clothes should be part of the dressing room equipment. Garments should not be hung in rooms where food is handled.
 3. Floors. Floors of receiving platforms or sheds and of all rooms used for canning processes should preferably be of concrete. They should be built to drain readily and should be smooth for ease in cleaning. On small units floors of wood with waterproof finish, inlaid linoleum, or other water-resistant finish may prove satisfactory.
 4. Walls and Ceilings. These should have a smooth washable finish that can easily be kept clean and is not materially affected by steam. They should preferably be of a light color.
 5. Ventilation. This is particularly important on canning units because of the amount of heat and steam generated. A room with windows on more than one side to provide cross ventilation is desirable. If windows are not sufficient to provide for good circulation of air, ventilating fans should be used. Inside rooms are not suitable for canning units unless adequate mechanical ventilation is provided.
 6. Lighting. All work areas in a canning unit should be well lighted. Natural light is desirable but supplementary artificial lighting should be provided for dark days. Provision should be made for regulating sunlight and preventing glare.
 7. Heat. Provision should be made to maintain a comfortable working temperature at all times. In most locations fans are needed in warm weather.
- C. Sanitation. All State and local regulations pertaining to canneries or to food-handling establishments should be met. Where such regulations cannot be applied, as may be the case in small rural canning units, or where there are no strictly defined regulations, the assistance of the State Department of Health should be sought in establishing adequate standards of sanitation.

1. Water Supply. Because of the large amount of water needed for safe and efficient operation of a canning unit, running water is a minimum requirement. It is desirable that hot as well as cold running water be provided. Water must be from a supply approved by the State Department of Health. If a regularly tested community supply is not available, the sponsor should arrange for water tests before a unit is put into operation and at frequent intervals thereafter.
2. Water Disposal. Where there is no sewage system the disposal of water is subject to approval by local health authorities.
3. Toilet and Lavatory Facilities. Toilet rooms should be separated by a room or vestibule from rooms used for any canning process or for storage. Plumbing must meet all sanitary regulations and toilets and lavatories maintained in a sanitary condition. If outdoor toilets are used they must be of approved construction and located at a safe and convenient distance from the cannery. Soap and individual towels should be provided for all project workers.
4. Disposal of Waste: Fruit and vegetables parings and other refuse should be removed from the preparation area at frequent intervals and kept in covered metal containers. It is the sponsor's responsibility to arrange for disposal in accordance with local health-department regulations. All waste should be removed from the project location daily.
5. Protection From Flies and Other Sources of Food Contamination. All windows, doors, and other openings to the outside should be screened for protection from flies. Screens should fit tightly and be kept free from breaks. Removable screens of fine wire mesh are recommended; mosquito netting may be substituted if necessary. Screen doors should be self-closing.

Curtains should not be used at windows as they collect dust which may be a source of contamination.

Canneries should be kept free from rats, roaches, and other pests.

D. Equipment. In considering equipment for a canning unit it is necessary to have in mind a definite plan of operation, since the kind and amount required depends on the methods used, the daily production expected,

and the number of workers to be employed. The items listed below are considered as minimum essentials.

1. For Steam Canneries.

- (a) Steam boiler, to carry the required volume of steam at not less than 35 pounds pressure, with connections to retorts, exhaust boxes, and blanching vats.
- (b) Exhaust box of commercial type with capacity for exhausting maximum number of cans to be processed daily.
- (c) Steam pressure retorts with total capacity to meet maximum daily requirement. Retorts should be piped with steam and water and equipped with thermometer, compound pressure gauge, and safety valve. Automatic controllers and recording thermometers are desirable.

It is advisable to pipe steam pressure retorts for pressure cooling. Should be equipped with 1/8-inch petcock for "bleeding" retort and "blowing down."

- (d) Retort baskets or crates of size to fit retorts to hold cans being processed.
- (e) Crane and hoist for lifting cans into and out of retorts and cooling vats.
- (f) Tanks and vats for blanching produce before packing and for cooling cans. These should have steam and water connections, drain, and overflow outlet.
- (g) Blanching baskets of steel wire lined with galvanized iron mesh hardware cloth.
- (h) Power-driven sealers. (These may be leased from any major can company at a small rental.)
- (i) Floor trucks for moving produce, cans, and equipment.

2. For Pressure-Cooker Canning.

- (a) Stove space sufficient for operating the maximum number of pressure cookers and water-bath canners to be used and for other operations such as blanch-

ing. Sufficient heat to bring pressure cookers to the required temperature in not more than 5 minutes; otherwise the quality of the produce may be impaired. For large cookers it may be necessary to provide special heavy-duty gas or oil burners or electric units. A good coal range may be adequate but is often undesirable because of the amount of heat radiated into the room. Wood-burning stoves are not recommended because of difficulty in maintaining even heat. Individual burners set at a convenient height from the floor will facilitate the handling of cookers.

- (b) Pressure cookers, 25- to 90-quart capacity, strongly constructed to stand up under constant use. They must have steam-tight closing and be fitted with pressure gauge, safety valve, and petcock. The size selected should be in relation to the production on the unit. In small units where a variety of produce must be canned on the same day, cookers of different sizes may be desirable.
- (c) Master gauge or maximum recording thermometer for testing pressure gauges on cookers.
- (d) Water-bath canner. (May be used for canning fruits and acid vegetables.) This is a container deep enough to permit covering cans with at least an inch of water. It should have a cover to expedite heating. A wash boiler makes a satisfactory water-bath canner. Add a "false bottom" or rack. This should be used so that cans are not placed directly on bottom of canner.
- (e) Racks, to fit cookers and hold cans while processing.
- (f) Large kettles for blanching or precooking foods before filling cans, for heating water, and for preparing sirup or brine. These should be of heavy aluminum, stainless steel, or other noncorrosive metal.
- (g) Blanching baskets of wire mesh.
- (h) Tubs or vats for water cooling of tin cans.
- (i) Lifting tongs for handling hot cans.
- (j) Sealers. Heavy-duty hand sealers will be adequate for small units. Where daily production is high an electrically operated sealer is recommended.

A certain amount of additional equipment is needed in the preparation of food for canning and for general use on canning units irrespective of the type of operation.

1. Tables. From $2\frac{1}{2}$ to 3 feet of table space should be provided for each worker engaged in paring and cutting fruits and vegetables. Stain-proof metal tops are desirable but the initial cost is high. Galvanized iron is a material often used; however, the zinc it contains affects acid foods and care must be taken to keep cut surfaces of fruits and acid vegetables from contact with it. Hard wood treated with an acid- and alkali-resistant dressing makes a satisfactory table top. Heavy linoleum may be used to cover rough tables. It makes a good working surface and will give satisfactory service if properly cared for. These tables should be of such a height that workers can work comfortably when seated. Table space is also needed for filling cans and for labeling.
2. Chairs should be provided for workers engaged in activities which permit them to be seated. Sturdy wooden chairs with backs are preferred. Boxes and crates are not considered adequate for health and safety of workers.
3. Sinks. A sufficient number of sinks or metal tanks or vats (which are preferable) should be provided for washing produce, dishwashing, and cleaning activities. It is desirable to have separate units for these purposes. Laundry tubs make good vegetable sinks.
4. Containers to hold prepared fruits and vegetables. There should be a sufficient number so that every worker at the preparation table has easy access to one.
5. Galvanized iron buckets or other suitable containers to be used for waste at the preparation table.
6. Garbage and trash containers with capacity for a day's accumulation of refuse. These should be of metal, water tight, and fitted with covers.
7. Canning thermometer.
8. Covered containers to hold salt and sugar.
9. Measuring utensils: Quart cup, half-pint cup, sets of measuring spoons. The use of rubberized gloves or gloves coated with rubber is recommended for handling hot cans.

10. Scales.
11. Cutlery: Paring knives and large cutting knives, preferably of stainless steel.
12. Knife sharpeners.
13. Cutting boards.
14. Spoons: long-handled wooden spoons, tablespoons.
15. Vegetable brushes.
16. Ladles or dippers for filling cans.
17. Funnels. wide mouthed, for filling glass jars.
18. Pot holders.
19. Clock
20. Cleaning equipment: brooms, mops, mop pails, scrub brushes, scrub cloths, dish cloths, dish towels.

Consideration should be given also to mechanical equipment such as apple corers, bean cutters, pea shellers, and slicing machines for use in the preparation of fruits and vegetables.

E. Arrangement of Equipment. Equipment should be arranged to save steps and avoid cross travel. There should be a continuous line of operation from the first step to the last to provide for a steady flow of work with no loss of time or motion.

Before setting up a steam cannery it is advisable to study an efficient commercial layout.

Section 23. Organization and Management of Work. Regardless of the size of a canning unit it will be necessary to make a careful analysis of the jobs to be done in order that the unit may be efficiently operated for quality and quantity production. Every effort should be made to organize and lay out the various jobs so that an orderly and continuous flow of work can be maintained. The successful management of a canning unit is largely the responsibility of the unit supervisor. The technical supervisor should in every instance set the work standards and determine the specific methods of all canning operations. Without careful guidance and control of all phases of canning operations there will be a waste of time and materials which will result in low production, excessive unit costs, and possible spoilage of canned products. To avoid waste of perishable materials before canning and to eliminate danger of spoilage after canning it is necessary that work be scheduled so that all perishable foods are canned while fresh and in prime condition. This is particularly important in the case of corn, peas, and other non-acid vegetables.

Irrespective of the size of a canning unit, it will be necessary to provide for the following operations:

1. Scheduling deliveries of food to be canned.
2. Receiving and checking produce.
3. Removing of husks, stems, and other waste.
4. Washing products.
5. Preparing products for canning: peeling, paring, chopping, and slicing.
6. Cleaning or washing of containers and equipment.
7. Checking mechanical and steam equipment.
8. Blanching or precooking produce.
9. Filling containers.

10. Exhausting cans that are filled with cold food.
11. Sealing containers.
12. Processing.
13. Cooling.
14. Marking cans.
15. Storing cans.
16. Disposing of garbage and waste.
17. Sterilization of waste containers.
18. Cleaning and sterilization of all working surfaces.
19. Cleaning of floors.
20. Cleaning outside premises.
21. Keeping records.

With the exception of the first two operations listed, all of the above jobs are performed daily on a canning unit. On many canning units the securing and receiving of produce will also be daily operations.

Weekly operations on a canning unit will consist of such jobs as checking and thorough cleaning of storerooms and cleaning windows, walls, and woodwork.

Supervisors should prepare work plans for each job. These should be simple and specific in order that workers may easily understand them. Assignment of jobs should be made in relation to the ability of the workers.

A high standard of performance on the part of the workers is essential to make the organization effective. The supervisor should endeavor to cultivate in all workers an attitude of cooperative responsibility and help them, through constant training on the job, to develop desirable work habits, such as:

1. Following directions accurately to insure good results.
2. Keeping work areas in order and work surfaces clean at all times.

3. Using time- and labor-saving methods of work.
4. Sweeping or mopping floor immediately when anything is spilled to avoid accidents.
5. Washing hands frequently as a sanitary measure.
6. Using hand towel instead of dish towel for drying hands.
7. Avoiding unnecessary conversation.

Safety Precautions Every worker on a canning unit should realize his responsibility in keeping the cannery a safe place in which to work. The nature of canning operations calls for careful observation of all safety practices if accidents are to be prevented. Precautions to be particularly observed follow:

1. Manufacturers directions for installing, operating, and cleaning all cannery equipment should be closely followed.
2. All retorts, boilers, pressure cookers, and other equipment should be tested frequently.
3. Only trained experienced workers should operate retorts, pressure cookers, and other steam equipment and mechanical devices of all kinds.
4. All slicing or chopping of products should be done on a cutting board if mechanical equipment is not used for this purpose.
5. Every precaution should be taken against slipping on wet floors. Floors should be frequently mopped and kept free from peelings and other particles of food.
6. Precautions should be taken against burns from steam, hot water, and hot containers.

Section 25. Canning Operations. Suggestions regarding various phases of canning operations are given in the following subsections.

A. Methods of Canning. Canning is the heating and sealing of food in air-tight containers in order to destroy microorganisms which cause spoilage. Two methods of canning may be employed on WPA projects, steam pressure and boiling-water baths. Under no circumstances should preservatives be used in canning foodstuffs on WPA projects.

1. Steam Pressure. Foods may be canned under pressure by use of steam retorts or pressure cookers. Higher temperatures can be obtained under pressure than can be reached by boiling. Non-acid vegetables and meats require more intense heat than boiling to kill harmful microorganisms and therefore must be canned by this method.
2. Boiling-Water Bath. By this method filled cans are placed in a container holding boiling water which comes 1 or 2 inches over the top of the cans. The container should be tightly covered and the water kept boiling constantly during the processing period. It is permissible on WPA canning units to use this method for acid fruits and vegetables but this practice should be held at a minimum and discontinued as soon as pressure equipment can be secured.

Open-kettle or oven canning should never be used on WPA canning units.

B. Selection of Food. The raw produce to be canned should be carefully selected. The quality of the canned food is no better than that of the raw material used. Therefore, it is important to can only fresh sound produce. Vegetables such as potatoes, carrots, and beets, which can be stored satisfactorily, should not usually be canned. It is seldom advisable to can dried foods such as fruits and legumes.

C. Selection of Containers.

1. Tin Cans. For the best results in canning, tin cans should be used. Tin cans are recommended over glass jars for canning projects for the following reasons:
 - (a) The initial cost is less.
 - (b) Heat penetration is better, thus making the processing period shorter.
 - (c) Cans require less space in retorts, which means greater volume production.
 - (d) No loss of liquid occurs in processing in tin cans.
 - (e) Tin cans may be quickly water cooled, thereby preventing overcooking which may result from slow cooking in glass jars.
 - (f) Less breakage or damage occurs in distribution.
 - (g) Tin cans may be stored to better advantage.

Three kinds of tin cans may be purchased; plain tin cans, "C" enamel lined cans, and "R" or sanitary enamel cans.

- (a) Plain tin cans are used for most fruits and vegetables and for some meats. Some foods cause a chemical reaction to occur in plain tin cans and the food becomes discolored.
- (b) "C" enamel cans are used principally for corn and for lima beans, peas, and other legumes. They should not be used for acid fruits and vegetables or for meats which contain fat since these foods will cause the enamel to peel off.
- (c) "R" or sanitary enamel cans should be used for red-meated fruits and vegetables to prevent bleaching of color. Pumpkin, squash, and sauerkraut should be canned in these cans to prevent corrosion.

The type of can should always be specified when ordering. Manufacturers provide information on types of cans to be used for the various foods. It is a safe plan to follow the recommendations of the manufacturer from whom the cans are purchased. However, it is a good policy to check these against recommendations of the State Extension Service.

In addition to stating type of can when ordering it is necessary to specify the type of gasket and the desired sizes of cans. Gaskets may be rubber or paper. The rubber gasket is usually preferred. Following are common sizes of cans and their capacity:

<u>Size</u>	<u>Content in cupfuls</u>
No. 1	1-1/3
No. 1 tall	2
No. 2	2-1/2
No. 2 1/2	3-1/2
No. 3	4
No. 5	7
No. 10	13

The No. 3 cans are recommended for most foods; however, the No. 5's and 10's may be used for some purposes. These large cans should not be used for canning nonacid vegetables and meats because of the danger of spoilage, due to slower penetration of the heat into the food.

While some tin cans may be used two or three times, this practice should not be followed unless the State office has established careful regulations for using cans a second time. The used cans are reflanged on the sealer and sealed with new covers. Paper gaskets are recommended for making a better seal when reflanged cans are used.

2. Glass Jars. While glass jars are generally used for home canning they are not preferred for use on canning projects for the reasons given under C-1, of this section. If acid fruits and vegetables are being processed in a waterbath on a small unit, glass jars may prove useful. They are also useful for jams and marmalades.

If it is necessary to use glass jars for canning, the following precautions should be taken:

- (a) Chipped jars should not be used since they will not permit proper sealing.
- (b) New, good-quality jar rubbers are essential.
- (c) Quart jars should be the largest size used for canning nonacid vegetables.
- (d) Sterilization of jars, lids, and rubbers is essential if a waterbath is used for processing.

D. Preparing Foods for Canning. All produce to be canned should be thoroughly washed. Every trace of soil must be removed, since the most dangerous microorganisms, and those most difficult to kill, occur in the soil.

Products should be graded according to size. For example, overripe string beans should be shelled and canned separately and not canned with a good canning grade of beans.

After washing fruits and vegetables, they are prepared for filling into the cans by peeling or paring and in some instances by slicing or chopping.

E. Filling Cans. Filling cans is an important step in both commercial and home canning. The proportion of liquid to solids varies with different foods. The liquid in a can helps to carry the heat to the solid materials and to expel the air from the can. Packing by weight may be desirable to obtain uniformity. If a can or jar is filled too tightly it interferes with sealing. The food must have room in the container for expansion during processing and to prevent bulging of cans from temperature and altitude changes. If cans are not sufficiently filled they will contain too much air. This may cause discoloration of the top layer of food.

Slack filling of cans sometimes causes internal rusting of cans and can distortion because of the air space.

The space between the food and the top of the can is designated as "headspace." This space may vary with different products. The headspace usually allowed on No. 3 cans is $\frac{3}{8}$ to $\frac{1}{2}$ inch.

F. Exhausting. Fresh foods contain air which must be driven out before sealing the containers. Unless this is done the canned products become discolored and lose a great deal of the natural flavor.

Exhausting may be done by blanching or precooking food before it is packed into the cans, or by heating the cans after they are filled and before they are sealed.

The air is removed from beans, peas, and other nonacid vegetables by blanching. The products should be packed immediately after blanching into cans and sealed for processing.

When the exhausting is done after the cold food is packed into the can, the open cans are given a heat treatment and then sealed. The time and temperature will vary with the product being exhausted. Tomatoes, fruits, and meats are exhausted by this method.

Tables giving time and temperature for exhausting various products may be obtained from manufacturers of cans, from the National Canners Association or from State Extension Canning Bulletins. Regardless of the method of exhausting, the temperature must always be tested immediately before sealing. Air is removed from food in glass jars during the processing period. This is possible because the seal is not completed until after the processing period.

G. Sealing. Since sealers vary in design, it is important to follow the manufacturers' instructions for the operation of all sealing machines. The adjustment of the sealer should be tested frequently during the day to insure tight seals. Instructions for testing seals are provided by manufacturers.

At the time cans are sealed the contents must be hot, this means that sealing must be done immediately after exhausting. The sealing temperature should be measured by inserting a thermometer at the center of the can. Glass jars should be sealed in accordance with the manufacturers' instructions.

H. Processing. After cans are sealed they are "processed"; that is, treated with heat at a given temperature for a specified length of time. Processing may be done in steam retorts, pressure cookers or, in rare instances, in a waterbath. The timing is started when the desired processing temperature is reached and not when the retort or pressure cooker is closed. Time tables for processing various foods at different altitudes may be obtained from manufacturers of the equipment which is in use at the canning units.

Gauges and safety valves on retort cookers should be tested periodically (suggested times are before canning begins and at the middle of the canning season).

I. Cooling. Tin cans may be pressure cooled or water cooled. If they are pressure cooled, water is admitted into the retort with pressure which approximates the processing temperature. This temperature is gradually reduced as the temperature in the can is reduced. All cans of No. 3 size or over should be cooled by this method. Manufacturers' directions for pressure cooling should be closely followed.

In water cooling the cans are cooled with cold running water as soon as they are removed from the retort or pressure cooker. Only pure, clean water should be used for this purpose.

Cooling should lower the temperature of the contents below 100° F. Cans cooled to this temperature will ordinarily dry readily. If they do not dry from the heat of the can they should be wiped dry to prevent rusting.

Cooling cans too quickly will cause them to buckle. Slow cooling may cause spoilage or overcooking.

Glass jars present a problem in cooling. They should be cooled in the air but not in a draft. They should not be inverted while cooling but this should be done afterwards to observe leakage.

No attempt should be made to tighten screw tops after jars are cool since this practice is likely to break the seal.

J. Labeling. The importance of coding and labeling all produce canned on WPA canning units cannot be overemphasized.

Each can should be stamped with code marks in accordance with established State regulations. These marks should indicate that the can belongs to a given lot, of a given kind of produce, and canned on a given date. This will make it possible to trace the cans of any lot in which spoilage occurs. In addition to the above information, all cans should bear the stamp "WPA, not to be sold." It is extremely important that containers be labeled so that none of the identifying marks can be removed. Paper labels should not be used for this reason. It is recommended that "WPA, not to be sold" be imprinted on the lid with a die or stamp which will press raised letters into the tin.

Rubber stamping, using canners' ink, is a quick method of labeling. However, it is sometimes possible to remove markings applied in this manner.

Labeling may be successfully done with a copper-sulphate solution applied with a sharp pointed pencil of wood. The solution etches the tin and makes a permanent mark. This is a slow process because it must be done by hand. The following formula is used for making this solution.

- 1 ounce copper sulphate crystals
- 1 quart water
- 1 ounce 5% sulphuric acid solution

Glass jars should be labeled with a glass pencil.

K. Checking and Storing. Before canned produce from WPA canning units is distributed or stored it should be held at the unit location at room temperature for at least 10 days. During this period some cans from each lot should be examined from time to time for evidence of spoilage. A final check should be made before storing permanently or distributing.

Canned food should be stored on shelves, not on the floor. The cans should be neatly stacked with ventilation space between them. For convenience, all cans of one kind of produce should be together, arranged with labels to the front.

Section 26. Housekeeping on Canning Units. It is extremely important that a high standard of cleanliness be maintained on canning units, since the quality of canned food is affected by the conditions under which it is prepared. The processes normally recommended for a particular product may not be adequate to insure safety if food becomes contaminated by harmful microorganisms before it is canned.

A. Cleaning and Care of Equipment. Special attention should be given to the care of canning equipment, since spoilage of canned food may often be traced to contamination through carelessness in cleaning the equipment with which it comes in contact. Manufacturer's instructions should be followed in the case of mechanical equipment. The following general directions should be observed:

1. All equipment should be thoroughly cleaned at the end of each day's operation. This includes dismantling, scrubbing, and steaming all mechanical equipment. This equipment should be left cold and dismantled until the start of the next day's run and should be well flushed with cold water before using.
2. Steam pipes should be set up so that they may be easily drained and cleaned. Perforated steam supply pipes should be carefully blown out during the cleaning operation.
3. Wooden equipment and surfaces should be cleaned with special care. Since they are porous they easily become infected with bacteria which may cause food spoilage. Wooden equipment and work tables should be scrubbed with hot soapy water to remove dirt and grease, followed by scalding water, or treated with steam if a steam line is available. Hypochlorite solutions (sodium, calcium, or potassium hypochlorite) are good disinfectants for wooden surfaces. They should be used after the soap and water cleansing.
4. Metal-top tables should be washed in hot soapy water and rinsed with hot clear water so that they will dry without rusting. Mineral oil should be applied on the table tops at the end of each day's operations to prevent rusting. Other oils, such as olive oil or motor oil, will impart flavors to the foods.

5. Metal utensils should be washed with soapy water, rinsed, and sterilized by immersion for 3 minutes in water at a temperature not lower than 170° F. or in a chlorine solution. Utensils of corrosible metal, such as iron, galvanized iron and copper, should be thoroughly cleaned before as well as after each use to remove surface corrosion.
6. In cleaning pressure cookers care should be taken not to immerse the pressure gauge in water. Methods recommended by the manufacturer for care of pressure gauges and safety valves should be followed.
7. Sealers should be kept clean and oiled. They should be checked at frequent intervals during the day's operation to assure that they are properly adjusted.
8. Tin cans should be washed in soapy water, rinsed, and drained, unless the manufacturer gives instructions to the contrary. Lids should not be immersed in water. They may be wiped with a damp cloth, but gaskets, especially paper gaskets, should be kept dry to avoid difficulties in sealing.

B. General Cleaning. A good standard of housekeeping requires that all rooms occupied by a canning unit be kept clean and in order at all times. This requires constant care on the part of all workers.

1. Floors should be free from litter and excess water. A thorough scrubbing or mopping is necessary at least once a day. In large steam canneries floors should be flushed with water during each shutdown period; that is, during meal hours and at the end of the day.
2. Walls should be wiped down weekly to remove dust and washed as often as necessary to keep free from grime. Woodwork should be kept free from dust and finger marks. The sponsor should provide for painting walls and woodwork as required to keep them in a sanitary condition.
3. Cupboards, shelves, and drawers should be well organized and kept in good order. They should be thoroughly cleaned at least once a week.
4. Frequent washing of windows is necessary because of the steamy atmosphere of canneries. Screens should be kept free from dust.

Section 27. Technical Inspection of Canning Units. The purpose of technical inspection of units of the food preservation project should be to evaluate the following:

1. Technical supervision of the unit.
2. Equipment for food preservation.
3. Methods employed in maintaining sanitation standards.
4. All canning operations.
5. Organization and management of work.
6. Accident prevention.
7. Personal cleanliness of workers.
8. Work standards of all persons employed on the unit.

A. Methods of Inspection. If worth while inspections are to be made, sufficient time must be spent on a unit by the technical supervisor to obtain accurate information necessary for making the above evaluations. One well-planned visit which is properly timed is worth many short, impromptu visits.

Technical inspections may be made by the State, district, area, county or city Technical supervisors, depending upon the local organization. They may be either scheduled or unannounced. Both types of visits are valuable.

B. Scheduled Visits. Project inspections which are scheduled in advance give the unit supervisor or foreman an opportunity to make preparations for a working conference. These persons should know that within a designated period of time they will have an opportunity to discuss with the technical supervisor current problems of operation, such as scheduling of produce to be canned, records and reports, work schedules, and production of unit.

The technical supervisor making the inspections should refer to records of previous inspections so that she will be ready to give needed help on specific problems. She should direct and participate in the inspection conference, but it should not be a "one sided" conference. Improvements made since the last inspection visit should be noted by the visiting supervisor and an evaluation of them made. Criticism should not be given unless definite suggestions for improvements are offered.

C. Unannounced Visits. It is necessary and valuable to make unannounced technical inspections of all food-preservation units. In this case the unit personnel will not be able to make advance preparations. However, the supervisor making the inspection should prepare the same careful plan as for a scheduled visit. These visits should not always take place at the same hour

of the day. All phases of work of the unit should be inspected through un-announced visits. The technical supervisor should, as in scheduled inspections, evaluate improvements noted since her last visit.

D. Records of Inspections. Written records of inspection visits to all units should be maintained in the district office.

Every inspection visit should be evaluated with the unit supervisor or foreman, and specific recommendations for improvements discussed. In addition to this, the visit should be followed by a written report to the unit incorporating the recommendations.

As improvements are made they should be recorded on inspection reports so that the State office may obtain at any time accurate information on all phases of the technical operation of units of the food-preservation project.

PART VII. QUICK FREEZING, STORING, DRYING, AND BRINING

Section 28. Quick Freezing. Quick freezing is a process whereby fresh foods, properly cleaned and prepared, are maintained at a temperature of zero or below at a cold-storage plant. The original freezing is usually done in a sharp-freezing room, and after freezing the produce is transferred to cold-storage lockers where the temperature is 0° F. The temperature fluctuation should never be more than 5°.

Freezing and storage of fruits, vegetables, poultry, butter, and meat is being carried on by a few States in connection with the WPA food-preservation projects. This method of preserving products makes possible a wide variety of fresh foods the year around for use on school-lunch projects. Foods preserved by this method can be safely stored for as long as a year.

Cold-storage lockers of different capacities are rented at prices varying from \$10 to \$12 annually.

The Farm Credit Administration and the Extension Service of the United States Department of Agriculture should be consulted for details of preserving food by quick freezing.

Section 29. Storing. In some sections of the country it is possible to store a wide variety of fresh vegetables in root houses, store rooms, pits, trenches, or mounds. The root crops, such as potatoes, carrots, beets, onions, and turnips, are the most commonly stored vegetables. However, cabbage, pumpkins, and squash may also be preserved by this method. If vegetables are to be stored successfully they must be of good quality, at the proper stage of maturity, and be stored at the correct temperature and the right degree of humidity.

Since storage conditions vary in different sections of the country it is necessary to secure information from authoritative sources on the approved methods of storage for a given locality.

Section 30. Drying. If fruits and vegetables are dried on WPA food-preservation projects, the process should be carried out in accordance with approved methods.

The same sanitation standards should be used in connection with drying food as are in effect on WPA canning units.

Under some circumstances drying may be the most advantageous method of preserving certain foods, such as apricots, peaches, apples, beans, and peas.

If sun drying is used very little equipment is necessary. If artificial heat is used for drying, either on a large or a small scale, commercial equipment will usually be necessary.

Section 31. Brining. Brining, as a method of food preservation, has been largely superseded by canning. Therefore, it will not ordinarily be used on WPA food preservation units except in cases of making sauerkraut or pickles.

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