Extension Bulletin 450 July 1932 Home Economics Series

HOME FOOD PRESERVATION

CANNING
DRYING
CURING
SMOKING
STORING

Oregon State Agricultural College
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Cooperative Extension Work in Agriculture and Home Economics
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HOMEMAKERS in many Oregon homes are making a valuable contribution to the economic independence of their families by a greatly increased program of food preservation. Fruits, vegetables, meat, fish, and poultry are being canned, dried, brined, smoked, or stored at home with a zeal that is comparable to the programs in food conservation undertaken by women so successfully during and following the world war.

Many Oregon farms produce a large share of the foods needed by the family throughout the year. The abundant food resources of our state make it possible for many who are not producing foods to obtain them and conserve them economically. Relief committees are concerning themselves with preservation of an abundant surplus.

Homemakers no longer fill many jars with one product merely because they have a quantity of it, regardless of the food needs of the family. Through the use of a food-preservation "budget" they insure adequate, well-planned meals throughout the winter months.

This bulletin is prepared in the hope that it will be a practical guide for homemakers who until recently may not have found it economically sound to preserve foods at home.

Many departments of Oregon State College have contributed essentially to the content of the bulletin. The School of Home Economics has given valuable assistance in the preparation of the entire bulletin; the Department of Bacteriology assisted generously in the preparation of statements regarding bacteriological problems in home canning; the Department of Horticultural Products contributed the material on tin canning; the Department of Vegetable Crops prepared the material on storage; the Department of Animal Husbandry contributed the section on smoking and curing of meat. Lucy A. Case, nutrition specialist, and Zelta Feike Rodenwold, home management specialist, have contributed much material and prepared the bulletin for use in the home.

CLARIBEL NYE,
State Leader of Home Economics Extension

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Home Food Preservation

HOME preservation of food by canning, drying, salting, smoking, or storing is true economy when a surplus of home-grown products exists, when a profitable exchange of surplus products can be made between growers, or when the cost of purchasing food and preserving it is less than the cost of buying the fresh product at a later date. It is true economy to spend time and energy in home canning and other forms of food preservation when larger returns cannot be obtained through other occupations, provided the labor involved does not result in impaired health of the workers. In proportion to the amount of food involved, food preserved by means of proper storage requires the least labor.

Present information indicates that food essentials needed by the body for growth and health are somewhat more abundant in fresh foods than in preserved and stored foods. Some vitamin content is lost by canning, drying, and storing. On the other hand most dried foods contain a greater percentage of mineral matter than fresh foods. Neither canning nor drying affects the valuable roughage of fruits and vegetables. Salting and smoking meats apparently renders them somewhat less quickly digested than fresh meats, except in the case of bacon.

CAUSES OF FOOD SPOILAGE

There are two main causes of food spoilage. The first is enzyme action. Enzymes are complex substances produced by all living cells. They are capable of bringing about distinct chemical changes such as the ripening, over-ripening, and spoiling of foods.

Very small forms of plant and animal life, many of them so small that they can be seen only through a microscope, exist everywhere about us, in the air, on food, on everything we touch. These small living bodies are called micro-organisms, and are grouped as bacteria, yeasts, and molds (see Figure 1). When allowed to grow on food, these micro-organisms cause changes, many of which bring about actual spoilage. Familiar examples of changes that stop short of spoilage are the souring of milk, ripening of cheese, fermenting of sauerkraut, rising of bread, and making of vinegar.

Bacteria are the smallest of the micro-organisms. Bacteria usually exist in the growing or vegetative form, but under conditions unfavorable to growth, such as long dry seasons, some of them may pass into a resting or spore state. The spore is very resistant to even prolonged boiling. It is important to understand this, because the probable presence of bacterial spores in certain products determines the method suitable and the time required for canning them.

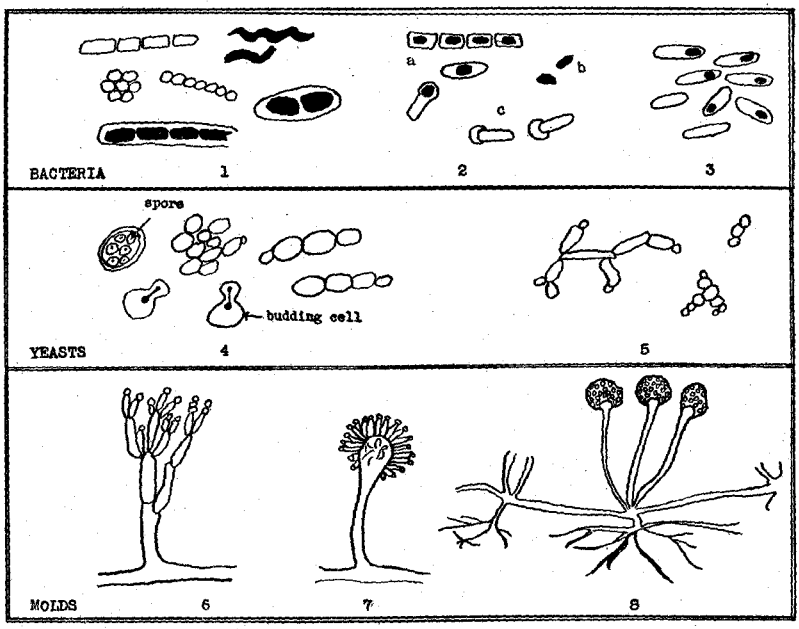

Figure 1. SOME ORGANISMS THAT CAUSE FOOD SPOILAGE. 1. Common types of bacteria found in foods, vegetative or growing forms, easily destroyed by heat. 2. Spore-producing bacteria, heat resistant; (a) spores within the cells, (b) free spores, (c) germinating spores. 3. *Clostridium botulinum,* a rare but deadly spore-forming bacterium, extremely resistant to heat. 4. True yeasts (contain spores), common in fermented fruits, readily destroyed by heat. 5. False yeasts, *torula* (contain no spores); resistant to salt solution under 25% salt. 6. Common molds, found everywhere, a common cause of food spoilage; cannot grow unless air is present: (a) penicillium, (b) aspergillus, (c) rhizopus.

METHODS OF PRESERVING FOOD

High temperature plus sealing. The temperature of boiling water at sea level, if applied for a sufficient length of time, stops the action of food enzymes and destroys all micro-organisms unless they are in spore form. The steam pressure cooker develops a temperature above boiling. It is the only type of canning equipment recommended for meats, fish, non-acid vegetables, or other non-acid foods. Fruits and tomatoes on the other hand, contain acids, making it possible to destroy spores of harmful bacteria in these foods at the boiling temperature. It is therefore unnecessary to can them under pressure.

Low temperature storage. Low temperatures check the growth of micro-organisms and the ripening action of enzymes. Many foods such as apples, cabbage, and potatoes can be kept during limited periods of time by storing them at moderately low temperatures. The freezing process recently developed on a commercial scale is used in preserving berries and many other foods.

Drying. Moisture is necessary for the growth of micro-organisms that cause food spoilage. Food dried until its water content is below 20 percent is not likely to spoil.

Preservatives. Preservatives are substances which, added to foods, retard or prevent the growth of micro-organisms. Common food preservatives are salt, sugar, vinegar, spices, smoke, and saltpeter. Several harmful preservatives are on the market, sold as canning powders and under other names. Homemakers are warned against using such compounds.

CANNING

FACTORS IN SUCCESSFUL CANNING

Fresh products. *Two hours from garden to can* is a good rule to follow in canning vegetables and fruit. Quick handling prevents enzyme action and bacterial growth, both of which are hastened when food is allowed to stand in a warm place. Can only sound, fresh products.

Cleanliness. Dirty food is more likely to harbor organisms dangerous to health than clean food. Canning success depends to a considerable degree upon clean food, clean equipment, clean methods, and personal cleanliness.

Application of adequate heat or processing. Processing is a term applied to cooking which brings about sterilization of food or conditions that prevent the growth of the few remaining organisms. Food is processed by using one of the following canning methods—hot-water bath, open kettle, steam pressure cooker, or oven. All methods are not equally suitable for all products.

Air-tight seal. This prevents entrance of micro-organisms.

Jars and lids. Each of the several types of glass jars available on the market has its advantages. A good jar is simple in construction, can be sealed perfectly and washed easily. Colorless glass gives the food a good appearance. Jars with bubbles in the glass should be avoided. Wide-mouth jars are convenient for packing large pieces and foods that should be removed from the jar without injuring their shape, such as whole tomatoes for salads, halves of pears and peaches, and pieces of salmon. Half-gallon jars are recommended only for fruits and tomatoes. Heat does not readily penetrate to the center of closely packed large jars. Half-pint jars are convenient for sieved vegetables to be used for small children.

Testing jars. Examining jars and testing them for leakage saves time and money. The glass where the rubber rests and any other parts which function in producing a tight seal should be smooth and free from nicks and lumps. Any obstruction or roughness between the glass and the rubber or the composition lid may cause an imperfect seal.

To test jars for leakage, place hot water in the jar, adjust the rubber and lid and invert. If a screw-top jar leaks, see if the lid is bent up at the edge. A slightly bent lid may sometimes be straightened with pliers, or by placing it on a jar with rubber and carefully forcing the bent portion down.

Dented, bent, or nicked lids are caused by prying open a jar of food. Metal or glass jar lids should never be pried up from the rubber if they are the type that can be used again. To open a jar having a rubber, pull out the lip of the rubber with pliers if necessary. This breaks the seal and loosens the lid. Inverting the jar in warm water also aids in opening it.

If a jar having a glass top and wire clamp leaks when tested the cause may be traced to the top, the rubber, or the wire clamp. If the lid rocks when placed on the jar without a rubber, it is not likely that a good seal can be obtained. Shifting the wire clamp to a different position on the jar may remedy this fault. Leakage may be caused by a bulging rubber due to too tight a clamp, or by a poor seal due to too loose a clamp. To tighten or loosen the clamp, remove the larger wire and bend until adjusted.

Self-seal lids should be flat when laid on the jar. The composition ring that produces the seal should be free from dirt or other substance that would obstruct the seal. Old clamps that have lost their spring may in some cases be adjusted by bending them. Before processing a jar of this type, the clamp is fastened over the lid. Steam escapes during processing by forcing the lid up against the spring of the clamp. The clamp brings the lid down on the jar again as the pressure lessens. The composition ring in the lid is softened by heat and on cooling becomes hard, forming an air-tight seal.

Defective jars which can not be adjusted to give a perfect seal with the hot-water test should be reserved for jam, jelly, or other foods that can be sealed with paraffin.

Rubbers. Buying good rubbers is true economy. A good rubber is elastic, not brittle, and can be stretched without breaking. To test a rubber, pull it out to approximately twice its size. It should return to its original size when the tension is released. Another test is to double a single thickness of rubber sharply between thumb and forefinger. It should show no cracks or breaks. Since time and heat cause rubber to deteriorate, new rubber rings should be used each year. A tight, firm rubber is less apt to bulge and ruin the seal than an old stretched rubber. The use of two rubbers on a jar is not recommended. A good rubber rests flat on the sealing shoulder of the jar.

Sealing glass jars. To prevent breakage by expansion of steam within, glass jars are only partly sealed before processing. Some manufacturers state that their modern glass jars can be completely sealed before processing, when packed with boiling hot food. When processed, seal each jar as soon as it is removed from the container. The air-tight seal prevents entrance of micro-organisms.

PACKING GLASS JARS

Hot pack is a term applied when hot food is packed into the jars before processing.

Cold pack is a term applied when cold food is packed into the jars before processing.

Blanching. This term is sometimes applied to a short precooking prior to packing, to loosen skins of fruit or reduce by wilting certain vegetables.

Packing. Precooking the food in saucepan or kettle until thoroughly heated through and packing it into the jars hot shrinks the product and insures well-filled jars. Although precooking of meat and fish is recommended, they may be packed raw. Non-acid vegetables should always be precooked and packed hot. Precooking is not necessary with fruits and tomatoes.

When canning by the open-kettle method, the jar is filled to the top with the cooked food and liquid. In all other methods the jar is filled to within ½ inch of the top to allow for expansion during processing. The only exceptions are jars of corn, beans and lima beans, which are filled to within 1 inch of the top. When sirup, water, or other liquid is added to the food in the jar, it is added to within ½ inch of the top.

Pack all non-acid vegetables, meat or fish loosely enough in the jar to allow the ready passage of heat to the center of the jar, especially in the case of corn, greens, and other foods of compact viscous texture. If packed tightly, food in the center of the jar may not reach the boiling temperature during processing and will not keep successfully.

CANNING FRUITS

Use firm sound fruits that are well ripened, but not over-ripe. Can no fruit that is withered, unduly soft, partly decayed, moldy, or bruised. Freshness means improved flavor and improved keeping qualities. To prevent crushing soft fruits such as berries, gather in shallow boxes, baskets or trays which permit free circulation of air and prevent bruising.

Removing skins of peaches and tomatoes. Wash fruit carefully; lift from one pan of water to another; to remove skins of peaches and tomatoes, place them in a square of thin cloth or a wire basket, and dip in boiling water for 1 minute or until the skin can be loosened easily.

Preparing lye solution for peaches and tomatoes. Some clingstone peaches need to be dipped into lye solution. This is prepared as follows: Use an enamel or iron kettle, never an aluminum vessel. Make a solution of 4 ounces or about 4 level tablespoons of granulated lye and 2 gallons of hot water. Stir with stick or wooden spoon. Avoid getting lye on hands. Bring to a boil, and while boiling, immerse basket or cloth filled with fruit in the lye solution until fruit-skins are loosened or partly dissolved, which usually requires from one-half to one minute. Wash fruit at once, in running water if possible, until skin and lye are removed. Thoroughly rinse fruit after washing.

Most fruits have a better appearance and flavor when they are processed directly in the jar. In general fruits are packed into jars cold, then a hot sirup poured over them (see page 10). Fruit juice made from small and imperfect fruit may be used instead of water in making sirups.

Hot-water bath. Fruits and tomatoes are satisfactorily canned by the hot-water bath method. This method has supplanted the open-kettle method in much home canning.

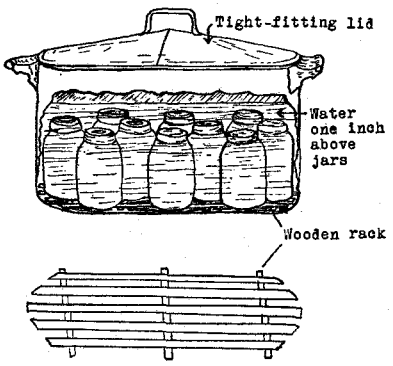

Figure 2. Arrangement of jars in boiler. Note suggested type of wooden rack to be placed in bottom of boiler.

(1) Fill a wash boiler or other large container with sufficient water to cover the jars 1 inch (see Figure 2). Heat the water.

(2) Wash and rinse the jars, lids, and rubbers. Place the rubbers on jars. Place in water and heat.

(3) Clean and prepare food for jars.

(4) Place the hot jars in a pan of hot water.

(5) Pack the food in the jars to ½ inch from the top. Avoid packing tightly. The pressure-cooker method is the only method recommended for non-acid vegetables, meats, and fish. If canned in the hot-water bath, precook vegetables 10 to 15 minutes or until thoroughly heated through. Although precooking meat and fish is recommended, they may be packed raw. If precooked pack while very hot.

(6) Add sirup to fruits to ½ inch from top of jars (see Table IX, page 42). To non-acid vegetables, although not recommended to be canned by this method, add the hot water in which they were cooked to ½ inch from top. No liquid is added to tomatoes and usually not to meats. Two teaspoons of salad oil may be added to each pint jar of fish.

(7) Partly seal jars (see Sealing glass jars, page 8). Keep jars in pan of hot water until all are packed.

(8) When all the jars to be processed at one time are ready, place them in the boiling water on a rack that prevents the jars from touching the bottom. The rack should be so constructed that water can circulate freely under and around it and around the jars. Jars should not touch each other. A pair of tongs is useful in lifting jars in and out of hot water.

(9) When the water is boiling, lower the jars slowly into it. They will not break unless the difference in temperature between jars and water is too great. The water should reach 1 inch above the tops of the jars.

(10) Cover the boiler tightly so that the water will boil again as quickly as possible.

(11) Begin to count the time when the water boils. Keep the water boiling for the necessary time as shown in Table IX. Add boiling water from time to time if necessary to keep the boiling water 1 inch above the tops of the jars. Spoilage may result if the heat is insufficient to keep the water boiling continuously.

(12) When the jars have been processed according to time table, remove immediately, and complete the seal.

(13) Wipe the jars and invert until cool to test seal. It is believed that if the jars are cooled on the side and rolled occasionally the fruit keeps its shape more satisfactorily.

Open kettle. A full pack is easily obtained when fruit is cooked before it is packed in the jars as in the open-kettle method. Fruits cooked in the jars, however, tend to be firmer and more attractive.

(1) Place rubbers on jars and boil for 10 minutes the jars, lids, and all utensils that are to come in contact with the food.

(2) Wash, trim, and prepare food for jar.

(3) Add sirup, water, or other liquid and flavorings to fruit.

(4) Bring to boil in covered container. Boil gently in a kettle that is not tightly covered until centers of the sections of fruit have reached the boiling temperature, from 10 to 20 minutes.

(5) Place funnel in jar.

(6) Place sterilized knife in jar until jar is filled.

(7) Fill jars completely with fruit and sirup.

(8) Wipe food and juice from rubber or other sealing surface.

(9) Take lid from boiling water and place on jar. Complete seal.

(10) Wipe jar and invert until cool to test seal.

Sirups for canning fruit. Sirup is made by dissolving sugar in water and bringing it to the boiling point. One quart jar of fruit requires from 1 to 1½ cups of sirup.

THIN SIRUP. Use 1 cup of sugar to 3 cups of water. THIN sirup is used for apples, pears, raspberries and other sweet berries if the fruit is to be used for pies or other cooked products to which more sweetening is to be added later.

MEDIUM SIRUP. Use 1 cup of sugar to 2 cups of water. MEDIUM sirup is used for grapes, prunes, plums, peaches, apricots, apples, pears, rhubarb, blackberries, gooseberries, huckleberries, raspberries, and cherries, if fruit is to be used chiefly as sauce.

THICK SIRUP. Use 1 cup of sugar to 1 cup of water. THICK sirup is used for strawberries, peaches, apricots, pineapples, sour cherries, rhubarb, currants, gooseberries, and loganberries, if a sweet product is desired.

VERY THICK SIRUP. Use 3 cups of sugar to 2 cups of water. VERY THICK sirup is used for pears, quinces, and rhubarb if a rich product is desired. For tart plums 2 cups of sugar to 1 cup of water may be used. For peaches 3 cups of sugar to 1 cup of water may be used if an extremely sweet product is desired.

Mix sugar and water together. Bring to a boil, stirring constantly until the sugar has dissolved. Add boiling sirup to fruit. Sirup flavors are improved by substituting fruit juice for the water.

TABLE I. SIRUP DENSITIES AND SUGAR FOR ONE DOZEN CONTAINERS

Fruit	Sirup density	To make sirup for one dozen containers			
		Qt. jars and No. 2½ cans		Pt. jars and No. 2 cans	
	Average quality	Sugar	Water	Sugar	Water
	%	*Cups*	*Cups*	*Cups*	*Cups*
Apples	30	6½	15	3½	8½
Apricots*	40	9	13½	5	7½
Blackberries	40	7	11	5⅓	8
Gooseberries	40	7	11	5⅓	8
Huckleberries	30	5⅓	13	3⅓	8
Loganberries	50	10	10	6⅔	6⅔
Raspberries	40	7	11	5⅓	8
Cherries	30	6½	15	3½	8½
Peaches*	40	9	13½	5	7½
Pears	30	6½	15	3½	8½
Prunes	30	6½	15	3½	8½
Rhubarb	40	9	13½	5	7½
Strawberries	40	7	11	5⅓	8

*For peaches and apricots add 1 cracked pit to each quart of sirup, boil 2 minutes, strain.

Oven canning. The dry air of an oven conducts heat less readily than does steam or hot water. This can readily be tested by comparing the feeling of quickly placing the hand in an oven registering 212° F. temperature and in water at 212° F. The oven does not burn the hand immediately owing to the low conductivity of heat by dry air, while the same temperature of water burns the hand badly. The temperature of the product in the jar never exceeds 212° F. regardless of the oven temperature unless the jar is sealed. Oven canning is successful for cherries and berries. It is not recommended for meat, fish, and non-acid vegetables.

To prepare jars of food for oven canning follow procedure described for hot-water bath method, page 10, sections 1 through 7. Preheat oven to 300° or 325° F. As hot cans are packed and partly sealed place them in shallow pans containing about ½ inch of hot water. Jars should not touch each other. Water in the pan prevents juice forced from the cans by expansion from burning; it has no other function.

Sterilized lids may be placed on jars after the process period is ended. Uncovered jars do not boil over readily. If jars are not full after processing, boiling fruit juice or boiling sirup may be added immediately after removing jars from oven, just before sealing.

When processing period is ended, remove jars from oven, complete the seal immediately, wipe off juice, invert jars until cool to test for leaks.

Time tables for oven canning are still in the experimental stage. The most satisfactory method of gauging the required time so far devised is to start counting time when bubbles are first observed in motion inside the jars, then reduce the temperature to 250° F. or 275° F. and process according to water-bath time table.

PRESSURE COOKER

The pressure cooker is a kettle so constructed that it will withstand steam under pressure. It is equipped with a steam cock to release air and

steam, a safety valve to release steam automatically if pressure becomes too great, and a pressure gauge to indicate the amount of pressure within the cooker. A thermometer attachment can be installed on any cooker and is desirable equipment because it indicates the degree of heat within the cooker and is not affected by altitude as a gauge may be.

Successful use of the pressure cooker not equipped with a thermometer depends on the accuracy of the gauge and the mechanical perfection of the cooker.

TABLE II. PRESSURE COOKER SIZES AND CAPACITIES

Cooker size, quarts	Glass jars		Tin cans	
	Pints	Quarts	No. 2	No. 2½
7	5	3	5	3
10	5	3	6	---
11	7	4	10	5
12	7	4	8 to 10	5
16	9	7	16	10
18	8 to 18	5 to 7	14 to 16	10
25	18	7	16	---
40	22	16	27	---
54	32	14	21 to 32	20

Care. The success of the pressure cooker depends in part on the care it receives. After it is used the cooker should be washed carefully and dried thoroughly. Clean the safety valve by washing ball and ball seat. Draw a piece of cloth or tape through the safety valve and steam cock. Store with lid upside down in top of cooker. This protects the apparatus on the lid, tends to reduce corrosion, and permits a circulation of air in the cooker.

Value. Non-acid foods such as meat, fish, poultry, and all vegetables except tomatoes, are safely canned only in a pressure cooker. Processing under pressure is recommended because the clostridium botulinum, a dangerous bacterium found particularly throughout the Pacific Coast states, has been known to withstand the temperature of boiling water (212° F.) continuously for six hours.

Steps in using the pressure cooker. When canning in glass jars, the following steps in use of the pressure cooker, should be followed:

(1) Place the rack in the bottom of the cooker.

(2) Pour water in the pressure cooker until it reaches ½ inch above the rack. Use hot water in hot cooker for hot jars. Use lukewarm water for cold jars.

(3) Prepare jars as described for hot-water bath, page 10, sections 1 to 7.

(4) Place filled jars on rack in cooker. Place cover on cooker, match arrow on cover with arrow on cooker, if so marked.

(5) Screw cover into position, fastening opposite clamps gradually until cover is tight.

(6) Leave steam cock wide open. Test safety valve by pulling up on stem.

(7) Apply heat under cooker. Cooker and water may have been heated before jars were placed inside, as suggested in (2) above.

(8) Heat until steam escapes freely from the open cock. Let steam escape freely for at least 5 minutes to insure that all air has been driven out of cooker. Otherwise the pressure gauge will indicate air pressure, not steam pressure within, and the temperature will be lower than the pressure gauge indicates.

(9) Adjust the steam cock so that a very small amount of steam will continue to escape throughout the processing period.

(10) Continue heating until the desired temperature is reached. (See Table IV, page 23).

(11) Begin to count cooking time when the gauge registers the correct pressure, *not* when the products are placed in the cooker. If the cooker is equipped with a thermometer disregard the gauge, except for safety, and go by thermometer.

(12) When the correct pressure is reached, reduce the heat or move the cooker back on the stove. It is important that the pressure remain constant.

(13) When the cooking time is up, close the steam cock, remove the cooker from the stove and let it cool slowly until the gauge reaches zero. After the gauge has stood at zero for 2 or 3 minutes, open steam cock slightly to determine whether steam remains in the cooker. If any steam escapes, close the cock immediately and let the cooker cool longer. If steam cock is opened wide, or if cooker is opened before all steam has condensed, liquid is drawn off the canned product.

(14) When cooker has cooled sufficiently remove jars and tighten lids at once.

(15) Invert jars until cool to test seals.

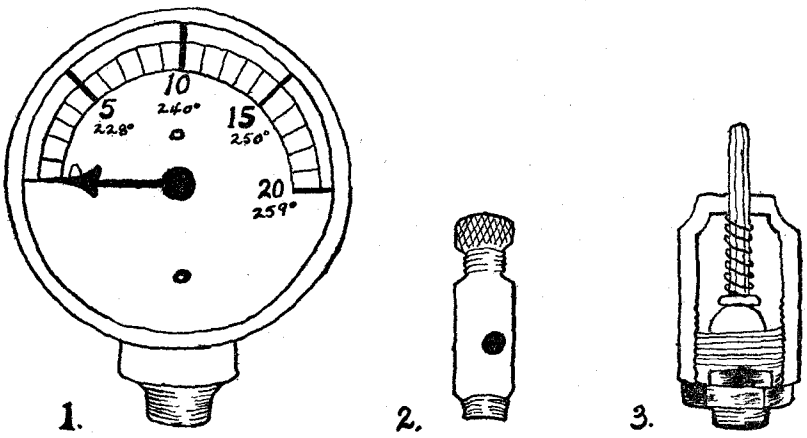

Figure 3. Pressure cooker parts: (1) Gauge indicating pressure. (2) Steam cock to release air and steam. (3) Safety valve to release steam automatically if pressure becomes too great.

CANNING MEATS AND FISH

Meats. Butcher only fat healthy animals. Bleed well. Have meat entirely free of animal heat. Allow at least 24 hours after butchering before canning. Handle meat with all possible cleanliness. To clean meat, wipe with clean damp cloth; do not wash. Cut into pieces suitable for serving and to fit the jar. Wide-mouth jars are convenient for packing meat. Meat may be packed raw, seared, roasted, fried, stewed, or made into cakes, paste, sausage or soup. Pork may be ground and seasoned, formed into balls, seared and packed hot. Flour, meal, bread crumbs, or other starchy coating should not be used in preparing meat for canning, because such a coating may obstruct the passage of heat to the center of the jar. Water is not used in packing except when meat is fried or seared; meat drippings are then diluted with a small amount of water, brought to a boil and poured over the meat in the jar. Process precooked meat the same length of time as raw meat.

Meat should not be packed tightly. Bones may be left in or removed. Bones are better conductors of heat than the flesh of meat and aid in sterilization. Pack meat to within ½ inch of top of jar. Use 2 teaspoons of salt to each quart of meat. Remove grease from sealing surfaces before adjusting lids. Jars of modern glass filled with hot precooked meat may be sealed completely before processing without breakage, manufacturers state. Jars containing raw meat should be only partly sealed before processing, then seals completed immediately after processing. Place each hot jar in the hot pressure cooker as soon as it is packed. If meat is packed cold, then place each jar in the cold cooker until the entire cookerful is prepared. Follow pressure cooker directions. (See page 13.)

CAUTION. **Before tasting home canned meats, fish, poultry and non-acid vegetables boil them for 15 minutes or until all of the food has reached the boiling temperature. Burn canned products that show any signs of spoilage or mix with 1 tablespoon of lye and bury.**

Poultry. By canning surplus cockerels in the summer and non-laying hens at culling season, feed costs may be reduced and a delicious food provided for the season when it is expensive or unavailable.

Bleed poultry well and cool thoroughly. Allow at least 6 hours to elapse between killing and canning poultry. Clean without soaking in water, as water extracts meat juices and renders meat stringy and tough. Cut into pieces as for boiling. Remove flesh from breast. Retain other bones.

Chicken may be canned raw, fried, or roasted. To pack raw chicken, first place a drumstick in a clean jar, then place the thigh next to the drumstick, and two wings next to the thigh, fitting the elbow of one wing into the elbow of the other. Place neck portion in center of jar with rib end down. This acts as a support for the pieces already in jar, and also aids in penetration of heat to center of jar. Fit in remaining pieces to fill lower part of jar. Cover neck piece with back and spread breast meat on top of back. Pack poultry without livers and gizzards to within ½ inch of top of jar. Add 2 level teaspoons of salt to each quart jar. Add no liquid. Remove any grease or other particles from the sealing surfaces of the jar, partly seal jar, process according to schedule, and complete the seal im-

mediately after processing. The steam pressure cooker is the only method recommended for canning poultry, since meat offers a favorable medium for the growth of the more resistant spore-forming bacteria (See Table VIII, page 40.)

To can fried chicken, prepare in the same way as for raw chicken, then season and brown in hot fat. Do not dip in flour, crumbs or meal; these hinder heat penetration. Cook meat until about three-fourths done. Pack while hot into hot jars. Pour hot grease from frying-pan into jars. Partly seal. Process same length of time as for uncooked chicken. Seal immediately after processing.

To can roast fowl, prepare, season, and roast in same manner as for serving at a meal. Cook until done. Cut meat from bones, pack into hot jars. Skim excess grease from gravy and pour gravy over meat in jar. Partly seal. Process for same period as for uncooked chicken. Remove from canner and seal immediately.

Rabbits may be canned following same directions as for chicken.

Wide-mouth jars are convenient for packing poultry and rabbit.

After opening can, before tasting, steam in covered pan or boil all poultry or rabbit for 15 minutes. See CAUTION, page 15.

Fish. Can only absolutely fresh fish. It is best to bleed fish directly after catching, by cutting the throat with a knife. Remove head, tail, entrails, and the dark membrane that covers the abdominal cavity of some fish. Press the blood out toward the back bone. The skin and backbone are usually removed from large fish such as salmon though the fat that lies just underneath the skin adds greatly to fish flavor. In the case of smaller fish, skin and bones are retained. Chowder may be made from the backbone and flesh that adheres to it.

If the skin is to be retained, the fish must be scaled. To remove scales, dip fish for a few seconds into boiling water and scrape. Clean fish by wiping with a clean damp cloth, or washing quickly in water. If salt-water fish need to be washed, wash them in salt water, using ¼ cup of salt to 1 gallon of water. Fish flesh can be hardened if desired, by soaking 2 hours in cold brine made from ½ cup salt in 1 quart water.

Cut fish into convenient-sized pieces for serving and for packing into jars. Wide-mouth jars are convenient for packing fish. Pack loosely to within ½ inch of top of jar. Add 1 level teaspoon of salt to each pint jar. If desired, 2 teaspoons of salad oil may be added to a pint jar of fish. The oil enriches fish and makes it easier to retain shape of pieces when slipping it out of jar, especially when skinned. Add no other liquid. Thoroughly clean sealing surfaces, especially if oil is used. Partly seal and process in steam pressure cooker. (See Table VIII, page 40.) After removing from cooker, complete seal immediately.

To can trout, scale and remove head, tail, and entrails. Pack raw or browned in hot fat. Either shallow or deep fat may be used for browning. Pack in an up-and-down direction in jar, cutting into proper lengths to fit jar if necessary. Add 1 teaspoon salt per pint, and if desired, 2 teaspoons salad oil. Add no other liquid. Thoroughly clean all sealing surfaces. Partly seal and process in steam pressure cooker. (See Table VIII, page 40.)

Clam soup or chowder made from canned ground clams, milk and onions, and other combinations, is a delicious and wholesome dish. Many families who spend vacations at the beaches take jars and cooker with them for canning ground clams. Slit open with knife or place clams in strainer over a small amount of hot water and steam for a few minutes until shells open. Save juice. Cut clams from shells. Wash thoroughly to remove sand. Pour hot water over black membrane on neck and remove. Discard all discolored or broken clams. Put clams through food chopper. Pack loosely into clean jars to within ½ inch of top. Strain clam juice and liquid used in steaming and add to clams, filling to not more than ½ inch from top of jar. Add 1 teaspoon salt to each pint. Partly seal. Process in steam pressure cooker. (See Table VIII, page 40). Remove from cooker and seal immediately. See CAUTION, page 15.

CANNING IN TIN

Tin cans have several advantages over other types of containers. The first cost is lower, the tin permits foods to be heated and cooled quickly, and there is no loss from breakage. On the other hand, canning in tin necessitates investment in a sealer and tin cans are used safely only once for canned fruits, meats, and vegetables.

Kinds of tin cans. Tin cans are sold by hundred lots or thousand lots in standard sizes. Three kinds are obtainable.

PLAIN. Safe for all purposes so far as food value is concerned but unsatisfactory for certain foods, especially the highly colored foods.

INSIDE ENAMEL. (Also caller R or sanitary enamel.) Preserves the color of such highly colored products as red berries, cherries, strawberries, prunes, and beets.

C-ENAMEL. Prevents discoloration of products containing sulfur, such as corn, peas, succotash, hominy, crab meat, clams, fish, and chicken. Never used for acid products.

TABLE III. COMMON SIZES OF TIN CANS

Standard can	Average net weight	Average capacity
	Ounces	*Cups*
No. 1	11	1¼
No. 1 (tall)	16	2
No. 2	20	2½
No. 2½	28	3½
No. 10	106	13

Steps in using the pressure cooker when canning in tin cans. The following steps should be followed:

(1) Clean and prepare product.

(2) Examine can. Do not use a can with a dented rim or one torn at the side seam.

(3) Mark cans with lead pencil, nail, or other sharp instrument, or with tin-can ink.

(4) Pack product in the marked cans. Pack hot or cold according to directions given below under (5) or (6).

(5) COLD PACK

a. Pack fruits cold. Meats and fish are precooked or packed cold. Avoid a tight pack.

b. Add boiling sirup to within ⅜ inch of the top of the cans. When packing meat or fish, add salt and liquid.

c. Exhaust or preheat the can. To exhaust, heat the filled cans in a pan of boiling water reaching to within ½ inch of the top of the cans until the temperature of center of the cans is approximately 150° F. The purpose of this preheating is to expand the contents of the cans so that expansion after sealing will not be sufficient to break the seams of the cans.

d. When the cans are sufficiently heated, or exhausted, seal them promptly on the tin-can sealer.

(6) HOT PACK

a. Pack all non-acid vegetables hot. (See Table VII, page 38).

b. Add boiling water in which they were cooked, to within ½ inch of the top of the can. Add salt.

c. Seal each can immediately after filling. (See directions for Sealing, page 19.)

(7) Place the cans in the pressure cooker immediately. The cooker with the water reaching ½ inch above the rack should be ready and very hot. If the cooker is large or the product requires a long period of cooking, more water may be needed. The product will be scorched if the cooker is dry before the processing is completed.

(8) Place the cover on the cooker and proceed with the cooking. (See page 13.)

(9) As soon as the desired pressure is reached write down the time when the processing is to be finished. Process at the given temperature for the required length of time. (See Table VII, page 38.)

(10) When the cooking time is up open the steam cock wide except under three conditions. The pressure should be lowered gradually for pumpkin, corn, and spinach; if the cans are larger than No. 2 size; or if cans were sealed at too low temperature.

(11) When the gauge indicates zero, remove the cans from the cooker. Watch for signs of damage or leakage.

(12) Cool the cans completely and quickly by placing them under cold running water.

(13) Mark and date the cans of each batch for identification. If any spoilage develops later examine all the cans that were processed in the same lot.

(14) Observe cans for at least two weeks to see if bulges or leaks appear.

(15) Label and store in the coolest place available. The storage place should be dry enough to prevent rusting of cans.

Sealing. The steps in sealing tin cans are as follows:

(1) Install the sealer on a solid table. Keep the sealer well oiled.

(2) Fill the can as directed, page 18.

(3) Place the cover on the filled can.

(4) Insert the filled can in the sealer so that the bottom of the can fits into the ring on the bottom plate (lifter plate).

(5) Place the seaming roll lever in neutral position—that is, so that the rolls are at greatest possible distance from the top plate (chuck). In this position the can is raised into place without touching either roller. Carelessness in this regard may cause a dented lid and result in an imperfect seam.

(6) Swing the can, raising lever at the bottom of the machine around as far as it will go against the frame of the machine. This should raise the can, force the lid down, and press the lid tightly against the chuck. Machines are usually supplied with washers that can be placed under the lifter plate to adjust the height for different can sizes.

(7) Two operations are necessary to complete a seal. On some machines these two operations are performed automatically as the hand crank is turned. On other machines both a lever and the crank must be operated to complete the seal. The following directions, (8) through (12), apply to the second type of sealer.

(8) Seaming roll No. 1 (direction indicated by arrow stamped on machine) must be used first on the lid. It is followed by seaming roll No. 2 (this direction also is marked on the machine). If the second operation is done first, it will injure the can and prevent an air-tight seam.

(9) After the lid is pressed securely against the chuck, turn the crank steadily with the right hand clockwise; at the same time, with the left hand, hold the seaming roll lever firmly and push it steadily in the direction of arrow No. 1. Push very slowly at the beginning, then gradually harder. This operation rolls the seam, which must be not too tight and not too loose. This is one of the most important steps in operating the sealer. If the first seaming roll is forced in too rapidly, it may ruin the lid.

(10) Turn the crank several rounds after the first roll is in. This is to insure a smooth and complete roll.

(11) Continue turning the crank with the right hand, and then with the left hand pull the seaming roll lever gradually and steadily in the direction of arrow No. 2. Pull until the lever will go no further. The crank will turn slightly harder than during the first operation.

(12) After this has been done give the crank several more turns and the second and final seaming operation is complete. The rolled seam has been flattened and made air tight.

(13) Bring the seaming roll lever back to neutral position and remove the can by lowering the can-raising lever.

(14) The finished seal on the top of the can should resemble the finished seal on the bottom of the can.

To test sealer. Place two tablespoonfuls of cold water in an empty can and seal. Have on hand a vessel of boiling water sufficient to cover the can. Set aside, and as soon as the bubbles disappear from the surface, immerse the can until it is entirely surrounded by the hot water. This heats the water in the can and creates a pressure within the can. Can ends will bulge. Keep the can under the surface for five minutes, and if by that time no bubbles rise from the can seam, the can has been sealed air tight.

If bubbles rise from the can, the seam is not sufficiently tight and the seaming rolls need adjusting. Usually the second roll needs adjusting. To adjust follow manufacturers' directions.

Once the sealer has been tested and adjusted, another test should not be necessary until several hundred cans have been sealed or until a readjustment has been made to accomodate a can of a different size.

COMMON DIFFICULTIES IN CANNING

Keeping liquid in jars. Though loss of liquid does not affect the keeping quality of food if the jar is properly sealed, loss of liquid is nevertheless undesirable. Many jars of modern glass can be completely sealed before processing when filled with boiling hot food. This procedure is the most effective way of preventing loss of liquid from jars. Loss can be partly prevented in hot-water bath canning by keeping the water boiling continuously and in pressure cooker canning by observing the following directions accurately:

(1) Keep the pressure as steady as possible.

(2) Prevent escape of steam from the safety valve by regulating the heat carefully during processing.

(3) At the end of the processing period, remove from the fire, close the petcock to prevent further loss of steam, allow the pressure to reach zero, and then wait 2 or 3 minutes before opening the cooker. Open the steam cock cautiously. If steam begins to escape, close the cock again. Leave it closed only until all steam has condensed. Then remove the jars and complete the seal immediately.

(4) Handle the cooker so that the jars remain level at all times.

Spoilage. Any one of a number of causes may be responsible for spoilage.

(1) Use of stale or unsound products.

(2) Jars and lids not tested for leakage before packing.

(3) Use of old rubbers, or two rubbers on one jar.

(4) Particles of food, grease, or other obstruction on sealing surfaces.

(5) Opening jars to refill with liquid.

(6) Too short a processing period.

(7) Temperature too low, or irregular, during processing period.

(8) Too long delay between steps in canning; canning too much at a time; food waiting too long in warm kitchen, especially if piled in deep, covered containers; filled jars waiting too long at lukewarm temperature before processing.

(9) Filling jars too full, especially in canning corn, beans, greens, and lima beans.

(10) Packing jars too tightly, and thus causing slow heat penetration.

(11) Cooling jars too slowly.

(12) Not allowing extra time for altitudes.

(13) Storing jars at too high or too low a temperature.

(14) Lifting jars by tops, thus breaking the seal.

(15) Pressure of clamp against lip of rubber, or any other pressure against rubber.

(16) Tightening jar lids after jars have cooled.

(17) Failure to hold lid steady while adjusting screw band.

(18) Using lids on jars not intended for that type of lid.

(19) In the open-kettle method, using unsterilized jars, lids, rubbers, funnel, cup, or other equipment that comes in contact with food. Placing unsterilized knife in jar to release air bubbles.

Recognizing spoilage. When in doubt as to its wholesomeness burn or bury food. Do not taste it unless it has been boiled 15 minutes. Many indications of spoilage are readily apparent.

(1) Cloudiness of liquid. Over-mature peas may be cloudy although not spoiled.

(2) Discoloration of food.

(3) Off-odor of food.

(4) Off-flavor of food.

(5) Presence of gas.

(6) Change in texture of product; slippery, slimy, mushy.

(7) Swelling or bulging of ends of tin cans.

Safety precautions. Hot water, steam, glass, knives, and tin involve dangers to workers. Accidents can be prevented if care is used.

(1) Be sure that handles of utensils in which hot water or hot food are to be carried are in sound condition.

(2) Do not lift or carry a boiler filled with hot water. Transfer hot water in small quantities. Keep children away from hot foods and liquids.

(3) Let pressure return to zero before unfastening the lid of the pressure cooker.

(4) Test spring of safety valve each time before using. Clean safety valve each time cooker is washed.

(5) Avoid injury from breaking glass. Place cold jars in cold cooker and hot jars in hot cooker.

(6) Keep fingers and hands away from all cutting edges of machines and knives, also away from lye, steam, and hot water. Avoid using wet cloth holders in lifting hot articles.

(7) Handle sharp edges of tin cans with extreme care.

(8) Before tasting home-canned meat, fish, poultry, or non-acid vegetables, bring them to a boil and boil them for at least 15 minutes. Authorities differ as to the time of boiling. Some advise as long as 30 minutes. It is essential that all parts of the food reach the boiling temperature. Canned food showing any signs of spoilage should be burned or 1 tablespoon lye mixed with each quart of food and the mixture buried. Spoiled food should not be placed where animals can find it.

LABELING AND STORING CANNED FOODS

After the canned product has cooled, wash and dry each jar. Paste on each jar or tin a label giving name of product and date of canning, so that products canned earlier can be used first. Edges of shelves may be labeled instead of cans.

Group canned goods according to variety. Store in the coolest available dark place. To prevent rusting store tin-canned products in a dry place. Protect jars from strong light, which will fade or discolor food.

YIELD OF CANNED PRODUCT FROM RAW PRODUCT

The approximate yield of canned product from the raw product is indicated in Table IV.

TABLE IV. APPROXIMATE YIELD OF CANNED PRODUCT FROM RAW PRODUCT

Raw product	Amount	Canned product
		Quarts
Apples	1 bushel or 48 pounds	20
Berries	1 crate or 18 pounds	10 to 14
Cherries	1 lug or 24 to 28 pounds (flat weighs 12 pounds)	18 to 22
Peaches	1 lug or 24 to 28 pounds (flat weighs 14 to 18 pounds) (bushel weighs 40 to 50 pounds)	8 to 12
Pears	1 box, or 40 to 45 pounds	20 to 24
Prunes	1 bushel, 45 to 50 pounds	30
Tomatoes	1 bushel, 45 to 50 pounds (lug, 28 pounds) (flat, 20 pounds)	14 to 18
Asparagus (whole)	3 pounds	1
Beans, string	20 pounds	14 to 16
Beets, baby	1 bushel, or 60 pounds	17 to 20
Carrots	1 bushel, or 50 pounds	17 to 20
Corn	2 dozen ears	2 to 3
Peas, green	8 pounds	2
Pumpkin	4 pounds	1
Spinach, Swiss chard, beet tops	2 pounds	1
Fowl	2 pounds	1 pint solid meat or 1 pint stock thick enough to jelly

ALTITUDE AFFECTS PRESSURE

The boiling point of water depends on atmospheric pressure. At sea level the temperature of boiling water is 212° F. As altitude increases atmospheric pressure decreases and so permits water to boil at a lower temperature. At 5,225 feet altitude, for example, the temperature of boiling water is only 202° F.

An increase in steam pressure increases the temperature of the steam. At sea level, steam under 15 pounds pressure has a temperature of 250° F.

TABLE V. APPROXIMATE TEMPERATURES OF STEAM UNDER PRESSURE IN ALTITUDES FROM SEA LEVEL TO 1000 FEET

Steam under pressure of—	Temperature
Pounds	*Degrees F.*
0	212
5	228
10	240
15	250
20	259

Canning tables generally are based on the temperature of boiling water at sea level. Since heat penetration is a primary factor in food preservation by canning, allowances must be made in canning tables for canning done at altitudes above 1,000 feet. The following modifications are recommended by the Bureau of Home Economics, United States Department of Agriculture:

"*For water bath canning,* for each additional 1,000 feet altitude above 1,000 feet increase the processing time recommended in canning tables by 20 per cent.

"*For steam pressure cooker canning,* for each additional 2,000 feet altitude above 2,000 feet add 1 pound extra pressure to the pressure recommended in canning tables."

In case the cooker is equipped with a thermometer the pressure reading should be disregarded except for safety and the thermometer used.

DRYING FRUITS AND VEGETABLES

Drying is an economical and satisfactory method of preserving fruits and vegetables in Oregon. It is not advisable, however, to dry foods that can be grown in winter gardens. Dried products supplement these and the canned foods that in many homes fill every available jar.

PREPARATION OF FOOD FOR THE DRIER

Good quality in dried products depends on the use of fresh, tender, and perfectly clean food. One decayed fruit or root may give the entire lot an undesirable flavor. Blanching for 2 to 5 minutes improves the color of green vegetables and other products that oxidize readily.

Most fruits and vegetables, in order to be dried quickly, must first be peeled and sliced or cut. Various machines for cutting and slicing are available on the market at reasonable prices, but simple equipment consisting of stainless steel knives and large-size bread boards will be found satisfactory. All cutting surfaces of machines or knives should be kept clean and bright to prevent food from discoloring. Food is cut into ⅛- to ¼-inch slices or cubes. It is then placed in thin layers on racks, trays, or plates.

METHODS OF DRYING

Food is dried in thin layers on trays or dishes by the heat of the sun or a stove or in a rapid current of air furnished by an electric fan.

Desirable temperature for drying is between 140° and 150° F.

Drying time varies with the thickness and texture of the food. Stir the product and turn the shelves end for end several times during the drying process, in order to secure a uniform product. Test a drying product by breaking a section in two at the thickest part. If no moisture can be squeezed from the broken end, the food has dried sufficiently. Dried food should be leathery and pliable, but not so dry that it will snap or crackle. It should be dried uniformly throughout, but not baked or scorched. Food insufficiently dried will mold.

Corn. Boil two to five minutes, long enough to set the milk. Cut from the cob in whole grains, or cut tops of kernels and scrape off remainder.

Snap beans. Wash, stem, and tip. Cut into pieces ½ to 1 inch long. Blanch 2 to 5 minutes in boiling water, depending on maturity of the beans. Shell pod beans.

Peppers. Wash, cut in half, and remove seeds.

Peas. Wash, shell by hand or by wash wringer, blanch.

Spinach and other greens. Wash, trim, remove leaves from roots, blanch. Chopping hastens drying.

Tomatoes. Cook ripe tomatoes for ten minutes. Strain through ricer. Cook pulp as dry as possible without burning. Spread on plates in ½-inch thickness and set in drier. When paste is dry on top, turn it over. Continue drying until paste is brownish red. Use in gravies, soups, and many other ways in which canned tomatoes are used.

Asparagus. Wash and cut into ¾-inch pieces. May be blanched to improve color.

Apples. Peel, core, trim, and cut into eighths or slice in rings ¼ inch thick. To prevent discoloration, dip into cold salt bath, using 1 teaspoon salt to 1 quart of water. Remove surplus moisture.

Apricots. Wash, pit, "sulfur" if desired (*see* Pears and quinces). Dry cut side up.

Pears and quinces. Dry same as apples. Steam 10 minutes before drying if desired. Pears are sometimes given a sulfur-dioxide bath for from 4 to 6 hours to preserve their color. To sulfur, place wooden trays of freshly cut pears out of doors under a tight box, in which a pan of sulfur has been placed and ignited with live coals or shavings.

Berries. Wash, stem, spread in thin layers and dry slowly to prevent loss of color and flavor by dripping. Large strawberries should be cut in two and placed cut side up on the rack. A common rule is to stop drying at the point at which berries fail to stain the hand when pressed.

Peaches. Peel, pit, and cut into halves or preferably into smaller pieces. "Sulfuring" as for pears retains the color.

Cherries. Wash, stem, and dry with or without pitting. May be pitted when partly dry.

Prunes. Use tree-ripened prunes. Prunes dry slightly more quickly if dipped into boiling water until skins check.

Apple sauce. Core and peal well-flavored early apples and cook with small amount of water. Put through sieve. Dry like tomato paste.

STORING OF DRIED PRODUCTS

Food taken from drying trays is not uniformly dry. Portions that are more moist than others may cause mold to develop. To obtain an even degree of moisture, place the material in deep containers and pour it from one container to another once a day for three or four days. This process is called conditioning. If the food is found to be too moist after conditioning, return it to drying trays.

Infestation by certain beetles and moths may occur during storage, resulting in loss of the entire dried product. As a precaution, just before sealing and storing, spread products an inch deep on screens or in shallow pans or trays and set them in an oven with temperature from 140° to 150° F. Heat for thirty minutes. Store in tightly covered glass or tin containers. Stout paper bags and tight boxes are suitable containers for storing dried products, but the ends must be securely sealed with glue. Cloth bags are not sufficient protection from insects, but sealed paper bags may be placed inside cloth bags and hung from hooks or nails.

Store dried foods in a dark, dry place. They change color if exposed to light. It is a good practice to store the products in small units so that the entire quantity will not be exposed to the air each time the container is opened.

Examine dried products at intervals of a few months, and as a precautionary measure reheat them in an oven 30 minutes at 150° F.

HOME-MADE EVAPORATORS

A variety of evaporating trays and cabinets can be made at home from odd pieces of lumber and boxes and tin cans. For trays galvanized

wire screening with ¼-inch mesh or white cloth netting on wooden slatted shelves is used. Wire-screen trays are not desirable for loganberries and other foods where acid juices will be in contact with the tray.

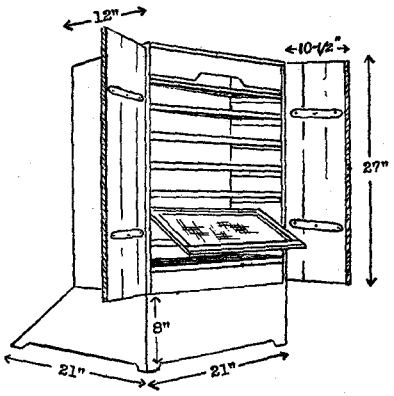

Figure 4. A home-made cabinet evaporator.

An evaporator should be built to allow ample intake, discharge, and uniform circulation of heated air around the product being evaporated.

The cabinet in Figure 4 is 12 inches deep, 21 inches wide, and 27 inches high and is open at the bottom and top to allow unimpeded air circulation. It contains eight interchangeable and reversible trays of ¼-inch-mesh galvanized wire cloth, inserted between double wooden frames. The base is of black galvanized iron sheeting, of 24 or 26 gauge thickness, and is nailed to the cabinet by ⅝-inch flanges turned in at right angles on the upper edges of the metal base. This base is 8 inches high, 21 inches wide, and 21 inches deep, this depth allowing the foot to gather heat from under the warming oven. One-inch openings at the bottom on all four sides allow free intake of air close to the hot surface of the stove. Doors are attached to the cabinet by hinges and can be fastened shut by two catches. The top of the cabinet is covered with a piece of galvanized-wire fly screen.

When first put into the drier, food is placed on the lower shelves and gradually moved to the upper shelves for completing evaporation.

The tray evaporator shown in Figure 5 is made of ¼-inch mesh galvanized wire cloth, 21 inches square. Bend screening up on four sides 1 inch from the edge. Leave one corner down for pouring off the dried products. Support drier by four inverted No. 2½ tin cans about 5 inches high and 4 inches in diameter, one at each corner. Attach cans to wire tray by means of a wire run through two sets of holes about three inches apart. Additional perforations in the bottom of the cans permit the emission of hot air.

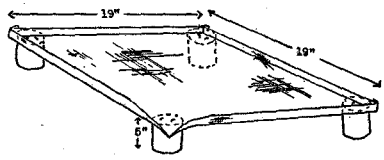

Figure 5. Home-made tray evaporator.

The evaporator shown in Figure 6 is made from an apple box, 12 inches wide, 10½ inches high, and 19½ inches long. Remove one end of the box, being careful not to split the boards. Strengthen this end by nailing lath across the top and sides of the box. Nail three ¾-inch cleats or similar strips horizontally along the inside of each side of the box, the first one 3 inches from the top, the second 3 inches below the first, and the lowest 3 inches below the second. These cleats give support to three trays.

Next, construct the three trays, 11½ inches by 17½ inches. Each tray is made from a piece of ½-inch galvanized wire mesh, 11½ inches by 20 inches. The 20-inch length allows for the wire to be folded over the ends, thus strengthening the trays. Make framework of four ¾-inch strips, or similar pieces, side strips being 17½ inches long and end strips a little less than 10 inches long. Fit end strips in between the side pieces and nail. Staple wire mesh on to frame and bend edges over.

For the door, use the end originally removed from the box. Attach it to the box by means of four 1-inch pieces of leather. If desired, metal hinges can be purchased for a few cents. The door illustrated is fastened by a slitted strip of oiled leather, hooked over a bent nail on the side of the box.

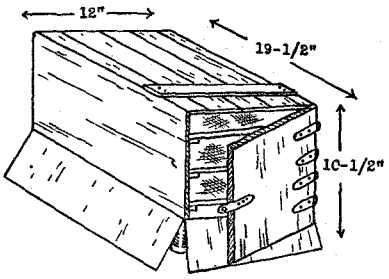

Figure 6. Home-made evaporator constructed from an apple-box.

Support the box drier by four No. 2½ tin cans, fastened and perforated in the same manner as those shown in Figure 5.

Prepare strips of tin to gather the heat from the stove into the box. With a can opener cut out the sides of four No. 10 tin cans, the size commonly used at bakeries and restaurants. Flatten and straighten the tin with pliers. Nail two of these pieces of tin along the sides on the outside of the box. Cut the other two pieces of tin into 11½-inch lengths. To cut tin, bend it and cut with can opener where bent. Nail one piece on back of drier in same manner as on sides. Nail the other piece to the brace inside the front end. Cut three strips of tin to cover the lower sides of the two ends and the brace, to prevent charring from heat.

Air circulates at the bottom of the evaporator between the strips of tin at the corners. The slats at the top allow the passage of air.

PRESERVATION OF VEGETABLES BY SALTING

Salt draws water from vegetables by the process of osmosis, forming a brine that acts as an antiseptic and so prevents spoilage.

The vegetables are packed in stone crocks, glass jars not suitable for canning, or hardwood kegs free from undesirable flavors or odors.

Any fine or coarse salt is used.

White muslin cut 6 inches larger in diameter than the crock or keg is used to cover the material after it is packed into the container. Or several thicknesses of cheese-cloth may be used. A round piece of hardwood board about 1 inch in thickness and just small enough to slip in and out of the keg easily is put on the cheese-cloth. A plate may be used instead of a board. Clean stones or bricks are used to weight the vegetables down in the brine.

A 5-gallon keg of salted vegetables requires approximately a 10-pound weight.

Dry salting without fermentation. Spinach, chard, kale, string beans, dandelion greens, beet tops, turnip tops, peas, and corn are preserved by salting without fermentation.

Use 25 percent salt. This proportion of salt prevents fermentation and the growth of molds.

(1) Weigh salt and vegetables.

(2) Cover bottom of container with 1-inch layer of vegetables.

(3) Sprinkle with a little of the salt.

(4) Repeat, alternating layers of vegetables and salt. Distribute the salt equally among the different layers. Any salt left over may be added to the top layer.

(5) Fill container about ¾ full.

(6) Cover top with cloth.

(7) Place board or plate and on this place weight. A brine should cover the vegetables in about 24 hours. If it does not form, prepare a strong brine by dissolving one pound of salt in 2 quarts of water. Pour brine over vegetables until it comes up to the round wooden cover. A small amount of bubbling will occur.

(8) Store container in cool room. As soon as bubbling has stopped remove cloth and any scum or mold. Adjust amount of brine and weights so that brine comes up to, but not over, the cover. Pour very hot melted paraffin over the surface of the brine which is exposed. Do not move the container after pouring in the paraffin. If paraffin breaks, remove, remelt and replace. After vegetables are taken from the container, cover again with paraffin. Scum and mold must be prevented from forming if vegetables are to keep for a considerable length of time.

Dry salting with fermentation. Cabbage as sauerkraut and string beans are the vegetables most frequently preserved in this way.

Use 3 percent salt—that is, 3 pounds of salt to 100 pounds of vegetables. Proceed by the method described under Dry Salting Without Fermentation. If the salt and pressure of the weight have not extracted sufficient brine to cover the vegetables in twenty-four hours, a heavier weight may be necessary. Allow container to stand in a moderately warm room to ferment until bubbling stops. The time for fermentation varies from 8 to 28 days. Seal by procedure described above under (8).

Strong brine method. Prepare brine using 4 pounds of salt to each gallon of water. This amount of salt prevents fermentation. Keep vegetables submerged in brine by weight placed on wooden float. Peppers and cauliflower are preserved by this method. Before cooking, soak vegetables several hours in cold water.

Using brined products. All salted products are rinsed in cold water before they are cooked. Foods preserved in salt without fermentation may need to be soaked several hours. Soak several hours in cold water before cooking, changing the water several times. The vegetables may be freshened by suspending them in a coarse bag or colander in the top of a large kettle of water.

CURING MEATS AND FISH

Curing agents. Salt is the main ingredient of all curing processes. The principal agents used in curing meats are the following:

(1) Salt: Pure, finely ground salt is best to use.

(2) Sugar: Used in nearly all brining recipes and always in sweet pickling. Either white or brown sugar is satisfactory. Brown imparts its characteristic flavor to meat. Sirup or molasses can be substituted for sugar.

(3) Saltpeter: A very small amount is generally used. Saltpeter gives the characteristic red color to cured meat. It is not necessary but if omitted meat will have an unattractive gray color.

(4) Miscellaneous: Pepper, spices, onion.

TABLE VI. FORMULA AND SCHEDULE FOR CURING MEATS

Kinds of meat	Mixture for each 100 pounds meat			Dry curing time to the pound	Brining time to the pound
	Dairy salt	Sugar	Saltpeter		
	Lb.	*Lb.*	*Oz.*	*Days*	*Days*
Hams and mutton leg	8	2	2	3	4
Shoulders, pork or mutton	8	2	2	2	4
Bacon and mutton loin	5	2	2	2	3

For brining—use 4½ gallons boiling water for each 100 pounds meat.

Dry-curing meat. Meat may be cured without the use of brine as follows:

(1) Prepare the necessary amount of salt mixture (see Table VI).

(2) Divide the mixture into two parts.

(3) Use one portion to rub on the meat and around the bone of the meat.

(4) Pack pieces of meat in a barrel or pile them on a table. Place last piece with skin side up.

(5) After 3 days rub all pieces of meat again thoroughly with one-half of the remaining salt mixture. At this time repack the meat, placing the bottom pieces on top.

(6) After 7 more days (on the tenth day) again repack the meat, rubbing into it the remainder of the salt mixture.

(7) Cure the meat for the required length of time (see Table VI).

(8) Soak the cured product in fresh water 1 to 2 hours, then smoke or use.

Brining or sweet-pickling meat involves the following procedure:

(1) Work in a cool place.

(2) Provide an earthen jar or hardwood barrel.

(3) Prepare the necessary amount of salt mixture (see Table VI). If plain brine is desired, omit the sugar but use the other ingredients.

(4) Save out one-fifth or one-sixth of salt mixture.

(5) Rub meat with salt mixture which was saved out. Let the meat stand overnight or pack it immediately.

(6) One day before the brine is to be used prepare it by dissolving the salt mixture in boiling water (see Table VI). Let cool overnight.

(7) Pack the meat in a jar or barrel.

(8) Weight the meat with a clean hardwood board and a clean rock.

(9) Cover the meat with the brine.

(10) Mark on each jar or barrel the time when the meat is to be taken out of the brine.

(11) On the third day, repack the meat, shifting the bottom pieces to the top.

(12) On the tenth day, again repack the meat.

(13) Leave the meat in the brine for the required time (see schedule, Table VI, page 29).

(14) If the brine sours, remove the meat, wash thoroughly, and add new brine. New brine should contain slightly less sugar and salt than the original solution.

(15) When the curing time is up, remove the meat from the container and smoke or use.

Smoking cured meat. If a mild-flavored meat is desired, smoke only a small amount at a time. Bacon, the most difficult of the meats to store, becomes rancid readily. The active agent in smoking meat is the creosote in smoke which preserves and gives flavor.

(1) Cure meat by the dry-curing or brining method.

(2) Soak hams, legs of mutton, shoulders of pork or mutton, and mutton loin for two hours in cold water. Soak bacon for 30 minutes. Scrub the product with a stiff brush. This treatment gives smoked meats a brighter color and a milder flavor.

(3) String hams, legs, and shoulders through the shank and bacon and mutton loin through the flank. If a regular stringing needle is not available use a narrow-bladed knife to make an opening through the shank of meat and pull the string through with a loop of wire. To keep bacon or a boned piece of mutton loin square while hanging in the smoke, run a wooden or wire skewer through the flank end of the strip and insert a string just below it.

(4) Hang cured, washed meat in smokehouse over night to drain and dry. Be sure that no two pieces touch.

(5) The next day, as soon as the meat has stopped dripping, start the fire. If the meat is still dripping when the smoking begins, the lower pieces will be streaked. Use any non-resinous wood. Hardwood sawdust or corncobs make good starters. Resinous woods such as fir or pine discolor the meat, making it black.

(6) Bring the smokehouse temperature to between 100° and 120° F. A heavy fog of smoke is not necessary.

(7) Leave ventilators open, especially at first, to permit the moisture to escape.

(8) Continue the smoking until the meat has the desired color. Meat should be a rich mahogany brown color if smoked for two or three days.

Smoked salt can be used satisfactorily for small amounts of meat. If smoked salt is used, the meat is not so deep a color as meat smoked in the usual manner, but the flavor is similar. Meat so cured may not keep so long as meat smoked by the usual method because it has more water in it.

Wrapping and storing smoked meat. After meat is smoked it should be wrapped and stored as follows:

(1) Cool smoked meat.

(2) If desired, rub on the meat, to add flavor, ground black pepper, with or without a little red pepper.

(3) Cover the meat with parchment paper, which should be heavy enough to keep the grease from soaking the bottom of the bag.

(4) Put smoked product into muslin bags.

(5) Fold down the top of the bag and tie it securely. In the outside tie-string, make a loop from which to hang the meat.

(6) Hang in a dry, dark, cool place.

To construct a smokehouse. If a large amount of meat or fish is to be smoked a smokehouse is desirable. A common size is 6 by 8 feet square and 8 to 10 feet high (to the eaves). This height permits the meat or fish to hang 8 or 10 feet above the fire. Provide the smokehouse with plenty of ventilation so that the products will not get too hot. Build the fire on the floor of the smokehouse. (See Farmers' Bulletin 1186 for further details.)

A small, inexpensive smokehouse may be made as follows (see Figure 7):

(1) Knock both ends out of a barrel.

(2) Dig a ditch 8 inches wide, 8 inches deep, and 8 feet long.

(3) Cover this ditch with a piece of flat tin or metal to form a tunnel, or lay a stovepipe in the ditch.

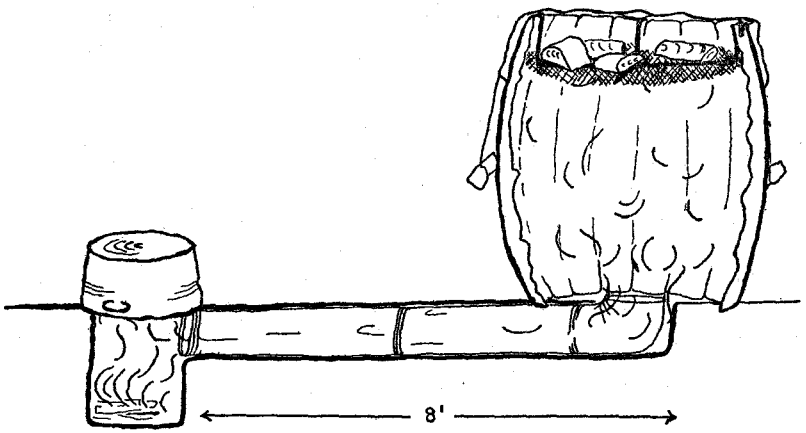

Figure 7. A smokehouse constructed from a barrel.

(4) Place the barrel on end over one end of the tunnel.

(5) At the other end of the tunnel dig a pit for the fire.

(6) Cover the pit with a tub or wash boiler, so that the smoke will be sent through the tunnel to the barrel.

(7) Across the top of the barrel fasten stout sticks to hold the meat to be smoked. A mesh wire may be used for this purpose and if it is set down into the barrel a little way it serves as a tray for small pieces of meat and provides a support to which to tie the larger pieces. Mesh wire is especially desirable for fish.

(8) Cover the barrel with a clean piece of heavy burlap or similar covering which will hold sufficient smoke in the barrel but permit adequate ventilation.

(9) Tie a stone to each corner of burlap to hold the cover in place.

Corning beef. Use the cheaper cuts of meat, such as the plate, rump and chuck, in making corned beef. Meat from fat animals makes better corned beef than meat from thin animals. It is desirable to corn at one time only such an amount as can be used within a month or six weeks.

(1) Cut the beef into pieces 5 or 6 inches square. Cut pieces uniform in thickness so they may be packed in even layers in the barrel.

(2) Cool meat thoroughly, then proceed with corning as soon as possible. Meat that has begun to spoil is unwholesome and will probably sour during the corning process. Do not cure meat that is in a frozen condition.

(3) Weigh the meat and for each 100 pounds allow 8 pounds of salt.

(4) Sprinkle a layer of salt ¼ inch in depth over the bottom of a clean stone jar or wooden barrel.

(5) Pack the cuts of meat as closely as possible, making a layer 5 or 6 inches thick.

(6) Add alternate layers of salt and meat, being careful to cover the top layer of meat with considerable salt.

(7) Allow the salted meat to stand overnight.

(8) Make a brine as follows: For each 100 pounds of meat use

4 pounds sugar
2 ounces baking soda
4 ounces saltpeter
1 gallon lukewarm water
3 gallons cold water

Dissolve sugar, soda, and saltpeter in lukewarm water. Add cold water and cool.

(9) Pour brine over meat, which has stood overnight.

(10) Keep the meat entirely under the brine by using a loose board cover with a weight on it. If any of the meat projects, it causes the brine to spoil in a short time.

(11) Keep brine in a cool place, as the sugar in the brine has a tendency to ferment.

(12) Keep the meat in the brine from 28 to 40 days, to effect a thorough cure.

(13) Watch the brine closely for spoilage. Meat corned during the winter that must be kept into the summer season is more likely to spoil during the spring than at any other season. If the brine appears to be ropy, the pieces of meat should be removed, washed vigorously with a stiff brush and hot water, then repacked and covered with new brine.

Salting salmon. Use only fish that is absolutely fresh.

(1) Remove head, tail, fins, entrails.

(2) Wash in salt water, ¼ cup salt to 1 gallon water. It is unnecessary to scale salmon. Drain after washing.

(3) Remove backbone and cut fish in two lengthwise.

(4) Press blood out toward cavity left by removing back bone. Wipe with clean damp cloth.

(5) Cut each side of fish into pieces 6 inches long.

(6) Place ¼-inch layer of salt in the bottom of the earthenware jar or hardwood keg.

(7) Place a layer of fish over the salt, skin side down.

(8) Cover the fish with ¼-inch layer of salt.

(9) Alternate layers of fish and salt.

(10) Place the last layer of fish, skin side up, and cover well with salt. Cover the container with a cloth or board.

(11) Let stand 3 days. A brine forms in the bottom of the container.

(12) At end of third day, wash salt from fish by holding it a few seconds under running water. Clean salt and brine from container. Do not use this salt again.

(13) Make a saturated brine. To do so, pour water over a quantity of salt, stir, and add more salt until crystals remain undissolved. Let cool thoroughly. Strain solution through cloth if cheap salt is used.

(14) Place the fish in saturated brine and cover with plate or clean hardwood board. Place a clean stone or other clean weight on the board. No portion of the fish should project above the surface of the brine. Cover the container.

(15) Let stand 1 week. Then change to a second saturated salt solution. Pack as described in section 14.

(16) Let stand in cool place. Examine occasionally. As the brine evaporates, add more brine to keep the fish completely covered. If the odor becomes too strong, discard the old brine and add fresh saturated brine.

(17) Before using freshen by breaking into small sections and soaking overnight in cold water. If still too salty, freshen in a second water.

(18) Salted fish may be creamed, escalloped, fried, or used in potato balls, salads, and other dishes.

Smoking salmon. Smoking fish gives a more desirable product than salting. Fish cured by the following method should keep for a considerable period.

(1) Follow the directions given for salting salmon, to the end of the third day, section (1) through (11).

(2) Remove the fish from the salt and wash it in running water for 10 minutes. This bath removes part of the salt from the outer layers of the fish and aids in the penetration of creosote from the smoke. Drain. Dry with a clean cloth.

(3) Lay on wire shelves in the smokehouse. (See Figure 7.) Avoid the use of hooks as mold may later develop where hooks enter fish. Fish should be at least 8 feet from the fire. Use a smouldering, smoking fire of non-resinous wood such as oak, apple, or alder. Do not allow the fish to become so hot that it drips fat.

(4) Keep the fire burning as steadily as possible. If the fire should go out, rebuild and continue smoking the fish as soon as possible. Turn the fish occasionally.

(5) Smoke the fish until it is coated evenly with a brown color slightly darker than that generally used for meat. This requires from 3 to 4 days and nights of steady smoking.

(6) Store by wrapping in heavy oiled paper and hanging in a bag in a cool place.

(7) Examine occasionally for mold. If mold starts, remove with a clean damp cloth, and resmoke the fish.

(8) Before using, freshen the fish by breaking it into small sections and soaking overnight in cold water. If still too salty, freshen in a second water.

(9) If the fish has been sufficiently cured it will keep for several months. Kippered salmon is given a very light cure and therefore deteriorates quickly. Smoked salmon may be creamed, fried, boiled, escaploped, or used in sandwiches, salads, potato balls, and other dishes.

STORAGE

Products in their natural condition can be preserved by storage instead of being canned or dried. Vegetables that can be kept successfully by means of storage include potatoes, beets, carrots, parsnips, salsify, turnips, pumpkins, squashes, cabbage, onions, dry beans, and, for a limited period, tomatoes and peppers.

Late-maturing vegetables are most suitable for storage. Select specimens that are sound, in the proper stage of development, uniform in shape and size, and free from blemish such as cracks, cuts, and bruises, which are usually conducive to rots and molds.

Temperature, moisture, and ventilation are important factors in storing vegetables. Moderately high temperatures cause shrinkage and breakdown, whereas temperatures below 32° F. may cause freezing and injury. With the exception of squash, pumpkin, dry beans, tomatoes, and peppers, temperatures ranging from a few degrees above 32° to 40° or 45° F. are most suitable. The optimum humidity or moisture varies with the vegetable being stored. Root crops store well in an atmosphere of high humidity, but potatoes, onions, squash, and dry beans store best under relatively dry conditions. Air circulation helps regulate temperature and humidity and may also remove unpleasant odors given off by the products in storage.

STORING IN CELLARS

Vegetables can be stored in the cellar, under the house, in pits or banks, in special houses built for storage, or in outdoor cellars. Cellars containing a furnace are usually too warm and too dry for vegetable storage. Partition off a room in the cellar or basement. Build the partitions of non-heat-conducting material, such as stone or hollow tile, or make the room as nearly air tight as possible. Then, if possible, include in the room at least one window to help in ventilating and regulating temperature. An earth floor is better than concrete.

Boxes, crates, baskets, or barrels may be used for storing, or bins may be built for the various products. Movable containers are preferred because they contribute to cleanliness. Shelves suspended from the ceiling or rafter beams are useful for storing pumpkin, squash, and other vegetables that would spoil if allowed to lie on the cool, damp ground or piled in bins. Remove tops from beets, turnips and carrots before placing them in boxes or barrels containing moist earth or earth and sand. Construct a slat floor a few inches off the ground and on it place boxes and other containers. This permits free circulation of air and prevents the container becoming a nesting place for mice.

STORING IN PITS

Potatoes, carrots, cabbage, beets, turnips, parsnips, and salsify may be stored in pits or trenches (see Figure 8). To construct such a pit choose a well-drained location. Dig a small hole 6 or 8 inches deep and of suitable size. Line with straw, leaves, or similar material, and fill with vegetables, heaping them into a cone-shaped pile. Cover with the same material used to line the pit, then add earth to a depth of 2 or 3 inches, or more according to severity of the winter.

Ventilation is necessary and may be secured in small pits by extending the straw covering of the vegetables through the earth covering. In larger pits a hollow tile, pipe, or flue of rough boards may extend up through the center of the pile of vegetables. Cap any ventilation hole with a board and stone. Pack earth firmly with back of shovel to make it as nearly waterproof as possible.

Several pits are preferred to one large one. Store small quantities of several kinds of vegetables in one pit so that it will be necessary to open only one pit at a time to get a varied food supply. Separate each kind of vegetable with straw or similar material.

Beans. Pick pods as soon as mature and spread in a warm, dry place. When thoroughly dry, shell and store in bags hung in a well-ventilated place. Allow bush beans to mature on the vines, then pull whole plant and cure it like hay. When dry, thresh beans, fumigate with carbon bisulfide, and store as indicated above. Food that has been disinfected with carbon bisulfide should be poured from one container to another several times to aerate before using. Carbon bisulfide is inflammable and should not be used near an open fire.

Beets. Pull and cut off tops. Pack in boxes or other receptacles containing moist earth or earth and sand. Place in cellar or store in pit. De-

sirable temperature is slightly above 32° F. Avoid storing in large piles. In Western Oregon beets and carrots are best stored by leaving roots in ground with tops off and putting earth over the rows when cold weather appears. It is necessary that these roots be in a moist place for storage otherwise they will shrink and be useless.

Cabbage. Cut solid heads of late cabbage and store in piles in pits. Or pull the plants, roots and all, and place them in a long pit with heads down so that a few may be removed at a time without disturbing all. Cabbage may be laid in rows on shelves or hung by roots from roof in an outdoor cellar, but should not be placed in the basement of a house since it has an unpleasant odor. Cabbage keeps best at a temperature of about 32° F. but is not injured by slight freezing. Danish Ball head cabbage is considered best for storage.

Carrots. Handle same as beets.

Onions. Store only mature, dry onions. Place in well-ventilated containers or on shelves or racks. Leave tops on during storage. Slight freezing does not injure onions provided they are not handled while frozen. A temperature of 36° to 45° F. is best. A circulation of air is essential.

Parsnips. Leave in the ground and dig as needed. Freezing does not injure them. May be stored like beets and carrots.

Peas. Handle same as dry beans.

Peppers. Handle same as tomatoes.

Potatoes, Irish. Cool temperature, but not freezing, and plenty of air are the two essentials for potato storage. When cold outdoors, allow cold air to enter storage; when warm outdoors, retain cold air by regulating doors and ventilators. Use bins or other containers not larger than 5 feet deep. Set them in from the wall to lessen possibility of freezing injury. If possible allow ventilation at bottom of bins by using slatted flooring. Protect from light. If stored in pits, handle like beets and carrots.

Pumpkins and squashes. Place on shelves so that they do not touch. Store in dry, well-ventilated cellar where humidity is relatively low and temperature is between 50° and 60° F. Squash must be free from bruises or abrasions when stored.

Tomatoes. If stored or kept for delayed ripening purposes, place where temperature is between 50° and 55° F. Harvest carefully. Avoid bruising.

Turnips, late. Gather, top, and store in pits as in case of beets. Do not place in basement storage room as they give off an unpleasant odor. Turnips shrink if not surrounded by moist atmosphere or moist soil.

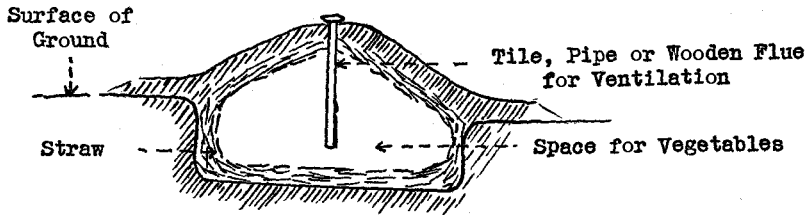

Figure 8. Pit for storing vegetables.

TABULATED DIRECTIONS FOR CANNING

Tables VII, VIII, and IX present directions and time schedules for canning vegetables, meats, and fruits.

Table VII. Directions and Time Table for Canning—VEGETABLES

CAUTION. Hot-water bath method of canning is not recommended for non-acid vegetables, meat, and fish. If use of pressure cooker is not possible, the essential steps in the hot-water bath method should be followed very carefully and the full period of time allowed for processing. Before tasting, boil home-canned meat, fish, and non-acid vegetables 15 minutes or until center of food has reached the boiling temperature. Canned food showing any signs of spoilage should be burned or mixed with 1 tablespoon lye and buried. Avoid placing where animals can find it.

Product	Preparation for canning*	Pressure cooker						Hot-water bath‡ (Boiling water, 212° F.)
		Pint jars		Quart jars		No. 2 and No. 2½ cans		
		Time	Pressure	Time	Pressure	Time	Pressure	Pint and quart jars
		Min.	*Lb.*	*Min.*	*Lb.*	*Min.*	*Lb.*	*Hr.*
Asparagus‡	Wash—tie in bundles—place butts in boiling water—cover tightly—boil 2 to 3 minutes—pack hot. Or cut in ½-inch lengths—bring to boil in water to cover—pack hot.	35	10	40	10	30	10	3
Beans, string‡	String—wash—cut in ½-inch lengths, if desired—boil 5 minutes uncovered—pack hot—pack loosely to within 1 inch of top.	35	10	40	10	30	10	3
Beans, lima‡	Shell—bring to boil in water to cover—pack hot—pack loosely to within 1 inch of top.	55	10	60	10	55	10	3
Beets, young	Wash—leave 1-inch stems and all root—boil or steam 15 minutes—slip skins—pack hot—add boiling water to ½ inch of top. Can only young, tender beets.	35	10	40	10	30	10	2
Carrots‡	Scrub—boil 5 to 15 minutes—pack whole, sliced or diced—pack hot.	35	10	40	10	30	10	2
Corn‡	Gather between dough and milk stage—can as soon as taken from garden—husk—silk—cut from cob without precooking—add as much boiling water as corn—heat to boiling—pack hot—pack loosely to within 1 inch of top.	90	15	....	....	90†	15	3†

Greens† (includes spinach)	Wash carefully—trim—immerse in boiling water 2 to 5 minutes or until main stem wilts somewhat—pack very hot—pack loosely.	60	15	....	....	55†	15	3†
Mushrooms	Wash—peel—drop into water containing 1 tablespoon vinegar per quart—precook 3 to 4 minutes in boiling water which contains 1 tablespoon vinegar per quart—pack hot—add boiling water.	25	10	35	10	25	10	1½
Peas†	Wash—shell—bring to boil in water to cover—pack hot. Peas may be shelled by dipping in boiling water and then running through wringer.	45	10	....	....	45†	15	3†
Pumpkin and Squash†	Wash—cut into large sections—bake or steam until easily removed from shell—pack very hot.	60	15	....	....	60†	15	3†
Tomatoes	See time table for fruits.	....	....	....	....	....	....	....
Spinach, sieved for infants†	Wash—trim—boil in small amount of water 15 minutes—press through potato ricer or sieve—bring to boil—pack loosely in half-pint jars—add ⅛ teaspoon salt.	60	15	....	....	55†	15	3†
Vegetable soup†	Use any combination of vegetables desired or available, such as spinach, carrots, and celery. Include green leafy vegetable. Wash—trim—chop—boil 5 minutes. Use process time of ingredient requiring longest cooking. Meat stock may be used as liquid for precooking and for filling jar.	70	15	....	....	70†	15	3†

*Unless otherwise specified, add 1 level teaspoon of salt to each quart jar of vegetables. Then add hot liquid in which product was cooked to within one-half inch of jar top.

†Containers larger than pint jars or No. 2 cans are not recommended.

‡See CAUTION at head of table page 38).

Table VIII. Directions and Time Table for Canning—MEATS

CAUTION. Hot-water bath method of canning is not recommended for non-acid vegetables, meat, and fish. If use of pressure cooker is not possible, the essential steps in the hot-water bath method should be followed very carefully and the full period of time allowed for processing. Before tasting, boil home-canned meat, fish, and non-acid vegetables 15 minutes or until center of food has reached the boiling temperature. Canned food showing any signs of spoilage should be burned or mixed with 1 tablespoon lye and buried. Avoid placing where animals can find it.

Product	Preparation for canning*	Pressure cooker						Hot-water bath‡ (Boiling water, 212° F.)
		Pint jars		Quart jars		No. 2 and No. 2½ cans		
		Time	Pressure	Time	Pressure	Time	Pressure	Pint and quart jars
		Min.	*Lb.*	*Min.*	*Lb.*	*Min.*	*Lb.*	*Hr.*
Chicken, with bone†	Kill at least 6 hours before canning—bleed well—draw and cut as for stewing—retain bones except breast bone—pack drumstick and 1 thigh vertically, neck in center to keep rest in place, then add other pieces on outside and back and breast meat at top—add 1 teaspoon salt per pint—add no liquid. May pack raw or seared. Can giblets separately. Use cockerels of 2 to 2½ lb., 10 to 12 weeks old, or fat hens.	70	15	....	....	70†	15	4†
Beef, lamb, mutton, venison†	Wipe with damp cloth—cut into convenient-size pieces—pack loosely—add 1 teaspoon salt per pint and no water. May brown before packing and add diluted pan drippings.	60	15	....	....	60†	15	4†
Pork†	Remove excess fat and prepare and pack as beef. May make into sausage—season—sear—pack and add diluted pan drippings.	60	15	....	....	50†	15	4†
Rabbit†	Use method given for chicken.	70	15	....	....	70†	15	4†

Clams, ground†	Open clams by slitting with knife or steaming in strainer over boiling water—remove from shell—save juice—wash—run through food chopper—fill jars—strain clam juice and water used in steaming and add—add 1 teaspoon salt to each pint.	120	10	....	....	120†	10	4†
Salmon†	Use only absolutely fresh fish. Remove head, tail, fins, entrails and back-bone—dip into boiling water and scale, or skin—wipe with clean damp cloth or wash in salt water—press out blood—cut into convenient-size pieces—pack loosely—add 1 teaspoon salt per pint—add no water. Early chinook best for canning. If skin is left on, fish has better flavor—if skin is removed or if fish has little fat, add 2 teaspoons salad oil per pint. Follow same directions for other kinds of fish.	120	10	....	....	120†	10	4†
Trout†	Remove head, tail, entrails—scale—may cut to fit jar—pack vertically—add 1 teaspoon salt per pint—add no water—may sear and add diluted drippings.	120	10	....	....	120†	10	4†

†Containers larger than pint jars or No. 2 cans are not recommended.
‡See CAUTION at head of table page 40.

Table IX. Directions and Time Table for Canning—FRUITS

Product	Preparation for canning*	Hot-water bath (Boiling water, 212° F.)		Pressure cooker (5 lb. pressure, 228° F.)	
		Pint or quart jars	No. 2 or No. 2½ cans	Pint or quart jars	No. 2 or No. 2½ cans
		Min.	*Min.*	*Min.*	*Min.*
Apples	Wash—pare—core—slice, quarter, or halve—drop pieces into cold salt solution (4 teaspoons salt to 1 gallon water)—pack—cover with boiling sirup.	15	10	10	10
	Or boil for 5 minutes in sirup—pack hot.	5	5	5	5
	Or bake as for serving—pack hot.	5	5	5	5
	Or make into apple sauce—pack hot.	5	5	5	5
Apricots	Treat same as peaches.				
	Or wipe with damp cloth—do not peel—halve and pit—dip quickly into boiling water then into cold—pack and add boiling sirup.	20† to 30‡	15† to 30‡	10	10
Blackberries, Loganberries, Raspberries, Gooseberries, Huckleberries	Wash carefully—remove cores and stems. To hull gooseberries, rub them together gently in a coarse bag. Avoid tight packing—add boiling sirup.	20	15	5	5
	Or to each pound berries add ½ to 1 cup sugar—boil 5 minutes, stirring gently—pack hot. Add more sugar to gooseberries if desired.	5	5	5	5
	Or to plump and prevent shrivelling and rising in the jar place alternate layers of fruit and sugar in preserving kettle and leave 12 hours.				
Cherries	Wash—stem—pack—add boiling sirup.	25	20	10	10
	Or remove pits—add sugar as desired—bring to boil—pack hot.	5	5	5	5
Peaches	Select firm, ripe peaches—immerse in boiling water 1 minute or until skins slip easily—plunge into cold water for few seconds—peel—cut into halves—remove pits—pack with pitted sides down in overlapping layers—add boiling sirup. Adding one cracked peach pit for every quart varies the flavor.	20†	15†	10	10
	Peel clingstone peaches if necessary with lye-bath of 2 tablespoons lye to 1 gallon water.	30‡	30‡	10	10

Pears	Select slightly under-ripe pears—pare—cut into halves or quarters—core (be sure to remove all white core)—drop immediately into cold salt bath (4 teaspoons salt to 1 gallon water)—wash before cooking—cook 4 to 8 minutes in hot sirup—pack hot—add boiling sirup.	20	20	8	8
	Or bake and process in jars.	5	5	....	....
Prunes or plums	Wash—pack—cover with boiling sirup.	20	15	10	10
	Or add sugar as desired—bring to boil—pack hot.	5	5	....	....
Rhubarb	Trim—wash carefully—cut into ½-inch lengths—pack—cover with boiling sirup.	20	15	10	10
	Or cut into ½-inch lengths—add 1 cup sugar for each quart rhubarb—bake in covered dish until tender—pack hot.	5	5	....	....
	Or cut into ½-inch lengths—fill to overflowing with pure, cold water—seal in sterilized jars and store. Use this method only if rhubarb is fresh and not overripe.	....	....	....	....
Strawberries	Wash—stem—place in preserving kettle in alternate layers with sugar, using ½ cup sugar to 1 quart raw berries (approximately 2 boxes)—let stand over night, at least 12 hours—pack in clean jars. This method plumps the berries, prevents shrinkage, and produces even distribution of berries in jar.	20	15	5	5
Tomatoes	Use firm, ripe tomatoes—place in thin cloth or wire basket—dip into boiling water 1 minute or until skins slip easily—plunge into cold water for an instant—core (be sure to remove all white core)—peel—pack whole or in pieces—pack tightly—add 2 teaspoons sugar and 1 teaspoon salt to each quart—may fill jar with juice of other tomatoes.	30	30	5 at 10 lb.	5 at 10 lb.
Tomato juice	Use firm, ripe tomatoes—wash well—cut into sections—add small quantity water—simmer until soft— stir occasionally to prevent burning—put through sieve fine enough to remove seeds—add 1 teaspoon salt to each quart—bring to boil—pour into containers.	20	20	5	5
Fruit juices	Wash fruit—crush—heat slowly—strain—add ¼ cup sugar to each quart fruit juice—bring to boil—pour into containers.	20	20	....	....

*Pack fruit into hot jars which are standing in hot water.
Unless otherwise indicated, when container is packed add sirup.
Fruits may also be canned by the open kettle method.

†For ripe fruit.
‡For firm fruit.

AFTER home canned, non-acid vegetables, meats and fish are removed from the jars and before they are tasted boil the food thoroughly for fifteen minutes or until all parts have reached the temperature of boiling water.

Food spoilage is due to microscopic living forms or to enzymes. See pages 5-6.

Food keeps if yeast, molds and bacteria are destroyed and if others are not allowed to reach it. See **Canning**, pages 7-23.

Food keeps if enough moisture is removed. See **Drying**, pages 23-27.

Vegetables keep by salting. See **Salting**, pages 27-28.

Meats and fish keep for some time if cured and smoked properly. See **Curing**, pages 29-34.

Many vegetables and fruits can be stored successfully. See **Storing**, pages 34-36.

Canning is a scientific process and not a matter of judgment. Follow directions accurately. See pages 37-43.