

CANNING

For Home Food

PRESERVATION

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CANNING *for Home Use*

Compiled by LUCY CASE GRUETZMACHER, THOMAS ONSDORFF,
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WHY DO CANNING?

THE preservation of surplus products at home for family use makes possible a variety in the diet, reduces the cost of living, and releases commercial food products for other purposes. Canning may wisely be limited to those foods that cannot be preserved successfully by less expensive and less laborious methods. Winter gardens, winter storage, and preservation by freezing involve less labor than canning. Salting, curing, and drying are less expensive methods of preservation than canning. Home-canned goods, however, have the advantage of being on hand, ready for use at short notice.

Good aims for canned products are: (1) safety for use; (2) freedom from spoilage; (3) retention of food values; (4) palatability and attractiveness; (5) amounts and choice of foods carefully planned so that the family is assured enough for a year-round supply and also a well-balanced selection for good nutrition.

I. TWO FUNDAMENTAL PRINCIPLES IN PRESERVATION OF FOOD BY CANNING

A. Application of adequate heat. In the air, water, and soil and on food and equipment are microscopic organisms that cause food to spoil. They must be destroyed by heat. Every particle of food within the jar or can must be brought to a sufficiently high temperature and held at that temperature a sufficiently long time to destroy the bacteria and other organisms that cause spoilage. Processing is the term applied to this heating of food that brings about sterilization or conditions that prevent the growth of organisms. Incomplete processing is a common cause of spoilage of canned goods.

Nonacid and low acid foods, such as meat, fish, poultry, and all vegetables except tomatoes, *are canned safely only in a pressure canner*. Processing under pressure is necessary because the *Clostridium botulinum*, a deadly bacterium found in the soil in many states, has been known to withstand the temperature of boiling water (212° F.) continuously for 6 hours at sea level. A temperature of 240° F. or higher is required to process these foods safely in a reasonable time. The only way to get these high temperatures is by use of a pressure canner.

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B. Airtight seal. Jars must be sealed so tightly after processing that air, which carries micro-organisms, cannot enter. Lack of airtight seal is very frequently the cause of spoilage in jars and cans. Never open jars after processing to add more food or liquid.

II. EQUIPMENT FOR CANNING

A. CONTAINERS

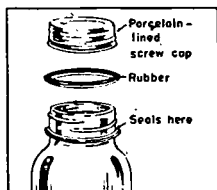
Know your jars and cans and how to seal them. The two main types of jar tops or closures are handled by opposite methods, as follows:

1. The closure with a separate rubber ring seals when the top is screwed down tightly. Since glass jars might break if sealed before processing, the lid with this type of closure is screwed only partly down before processing. It is screwed completely down after processing. In the case of jars with a rubber ring and 2 wire bails, the smaller bail is left up before processing and is pushed down after processing.
2. The other main type of closure is called the self-seal. It has a metal lid edged with a sealing compound, held in place by a metal screw band or clamp. This type of closure seals as it cools after processing. Screw the band firmly tight or apply the clamp before processing. Do not tighten after processing.

The term "mason" refers to any jar with threads at the top that is closed by screwing down a cap or band.

B. JARS WITH SEPARATE RUBBER RINGS

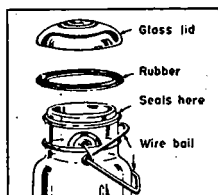
Test jar for leakage before using by enclosing hot water, sealing, and inverting. Using 2 rubbers on a jar is not recommended.



Standard mason jar

1. Standard mason jar with porcelain lined cap, usually of zinc, has a rubber ring that fits shoulder and seals at the shoulder. Some of these jars have a broad flat top edge and can be sealed also at the top of the jar. Some have a narrow rounded top edge. Such jars may not seal except with the type of closure that seals at the shoulder. Lids that are slightly bent may often be bent back into shape by placing on the jar without rubber and

pressing down with pliers. This jar should be opened by pulling out the rubber with pliers. Or invert the jar in warm water to loosen the lid. Do not pry up the lid and dent the edge.



"Lightning" type jar

Before processing, fit rubber down smoothly on shoulder of empty jar without unnecessary stretching. Pack jar, then screw cap down firmly and turn it back 1 inch, to assure a part seal.

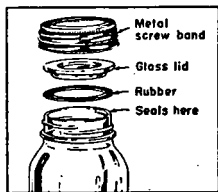
After processing, complete the seal by screwing the cap down tightly as soon as you take the jar from the canner.

2. "Lightning" type jar has same size rubber ring as standard mason, but the ring fits the ledge at the top of the jar. It has a glass lid held in place by 2 wire bails, one fitting in a groove in the lid. If the lid is too loose or too tight, remove the larger bail and bend it down or up in the middle until adjusted for a firmly tight seal.

Before processing, fit rubber ring on the ledge of the empty jar. Pack jar, apply lid, push long bail into the groove on the top of the lid, and leave the short wire bail up in a loose position.

After processing, complete the seal by pushing the short bail down against the jar as soon as you take it from the canner.

3. Three-piece glass-top closure has a special rubber ring of smaller size than the standard mason. Seals at the top of the jar, which has a flat, smooth, broad surface for the glass lid. Has metal screw band to fit standard mason jar. Safest to use this glass lid only on jars with flat broad-top edge. Use this screw band only with glass lids. Does not produce seal with metal lids; is too deep. Do not use the screw band made for self-seal jar *a*. These bands are too shallow. Do not use standard mason jar cap for these lids.



Three-piece glass-top closure.

Before processing, pack jar, fit rubber ring onto glass lid and place lid on jar, rubber side down. Screw metal band down tight, then, using your thumb as a guide, turn band back almost a quarter turn. *Caution*: If band is not turned back far enough the jar may become sealed and may break or explode.

After processing, screw the metal band down tight as soon as you take the jar from the canner.

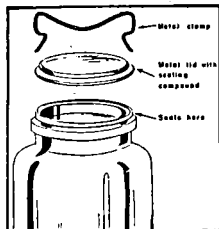
C. SELF-SEAL JARS

1. Self-seal jar has metal lid edged with sealing compound. Seals at top edge of jar when it starts to cool after processing. Lid held in place by shallow metal screw band that fits standard mason jars. Seal is assured only when lid is used on jars with flat, smooth, comparatively broad top edge. Screw band is too shallow to produce a seal when used over glass lids.

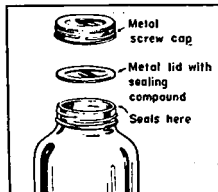
Wipe metal lids with clean damp cloth before using. Follow manufacturer's directions for each brand. Some require boiling before using. Disks with sealing compound should be used only once.

Before processing, pack jar and set lid on jar with sealing composition next to glass. Screw metal band down firmly tight, but not so hard that you cut through the compound. This lid has enough "give" to let air escape during processing.

After processing, leave the jar as it is. *Do not tighten the screw band.* To do so may disturb the softened sealing substance and may prevent a seal. This jar seals itself. (Occasionally the screw band becomes obviously loose. If so, hold the lid firmly in place and carefully turn the band down slightly. The lid should not move even slightly.) After 24 hours take off screw band if you can without forcing. If it sticks, cover for a minute or two with a hot damp cloth. Removing screw band allows seal to be tested and prevents deterioration of band for re-use. Scrub inside of bands with brush and dry thoroughly to prevent rust.



Self seal b.



Self seal a.

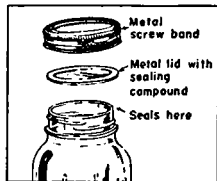
2. Self-seal jar has special metal lid edged with sealing compound. Seals at top edge of jar when it starts to cool. Lid is held in place by 1 metal clamp. Lid can be used only on special jar for which it is made. Jar can be used only with this special lid. Lid can be used only once.

Before processing, pack jar and set lid on jar, being careful that it fits and is level. Place 1 clamp over center of lid. It should snap into place.

After processing, leave the jar as it is. This jar seals itself. After 24 hours, remove metal clamp.

3. Coffee or other commercial jars may be used *only* for such products as pickles, preserves, and relishes. Avoid use in pressure canner or hot water bath cook, because of quality of glass.

Top edges of these jars are usually narrow and rounded and seal cannot be assured. Many commercial jars are made for vacuum sealing and an airtight seal cannot be made by home methods. They are made in a large number of sizes of tops and some seem to be sealed when they really are not sealed. The "63" size coffee jars come with metal screw cap. Self-sealing one-piece "63" lids can be purchased to fit these jars.



Self seal c.

Before processing, pack jar and set "63" lid on jar with sealing composition next to glass. Screw the band down tight. Be sure that food is very hot when jar is sealed.

After processing, leave jar as it is. It seals itself. To tighten the lid might prevent a seal.

D. RUBBER RINGS

Use only high quality rings to assure good seals on jars. Wash all rings in hot water.

Place hot wet rings on jars before filling jars.

E. PROCESSING EQUIPMENT

The use of the *oven* or *steamer* for canning is *not recommended*. Heat distribution is uncertain and spoilage may result. Oven canning has caused serious accidents to persons and property by violent breakage.

Meat, fish, and nonacid vegetables. A pressure canner is the only safe processing equipment for nonacid foods, which include meats, poultry, fish, and vegetables, except tomatoes.

Fruits and tomatoes. A boiling water bath kettle or other tall kettle with rack is used for fruits and tomatoes. Any flat bottomed clean vessel of sufficient depth with a good lid may be used for a boiling water bath. Height of vessel should be at least 8 inches for

pint jars and 10 inches for quart jars, so that water comes an inch or more over the top of the jars. A rack with level surface is needed. It may be made of woven wire, wooden slats, or perforated metal. Wooden racks should be weighted to prevent upsetting jars. If pressure canner is used as a boiling water bath, be sure that petcock is wide open and lid is set on loosely.

F. GENERAL EQUIPMENT

General equipment includes pans, stainless-steel knives, fork, brush, cup, measuring cups, quart measure, measuring spoons, jar funnel, jar lifter, ladle, long-handled spoon, clean towels or cloths, hot-dish holders. Holders made from old inner tubes are convenient. Special devices are available for paring, coring, pitting, shelling, slicing, cubing, grinding, and sieving food.

III. 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, producing better flavor, and there is no loss from breakage. On the other hand, canning in tin necessitates investment in a good sealer, and tin cans are used safely only once for canned fruits, meats, and vegetables.

A. KINDS OF TIN CANS

Tin cans are sold by hundred lots or thousand lots in standard sizes. Three kinds of cans are obtainable as follows:

Plain. Safe for all purposes so far as food value is concerned but unsatisfactory for certain foods, especially the highly colored foods. Plain cans are satisfactory for tomatoes, meat, and all white, green, and yellow products.

Inside Enamel (also called R-enamel, Regular, and Fruit enamel). Bright gold color. Preserves the color of such highly colored products as red berries, cherries, prunes, and beets. Use Inside Enamel cans for all fruits and vegetables of red, blue, or purple color except tomatoes. Re-enamel cans are Inside Enamel cans with an extra layer of enamel.

C-Enamel. Dull gold color. Prevents discoloration of products containing sulphur, such as corn, peas, succotash, hominy, crab meat, clams, fish, and chicken. Never used for acid products.

B. CAN SIZES

Common sizes for home canning are No. 2 and No. 2½ (see table). The sealer can be adjusted to different sizes. To make an airtight seam, very close adjustment is necessary when changing sizes. It is best practice to use only one size can on home sealers.

COMMON SIZES OF TIN CANS

Standard can	Approximate weight	Approximate capacity
	<i>Ounces</i>	<i>Cups</i>
No. 1	11	1½
No. 1 (tall)	16	2
No. 2	20	2½
No. 2½	28	3½
No. 10	106	13

C. TESTING THE TIN CAN SEALER

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

To test sealer, place 2 tablespoonfuls of cold water in an empty can and seal. Have on hand a pan of boiling water sufficient to cover the can. Reduce heat to stop boiling and immerse the can until it is entirely covered by the near boiling water. This heats the water in the can and creates pressure within the can. Can ends will bulge. Keep the can under the surface for 5 minutes and if by that time no bubbles arise from the can seam, the can has been sealed air tight. More accurate tests are used in canning factories.

If bubbles arise from the can, the seam is not sufficiently tight, and one or both of the seaming rolls need adjusting. Leaks are most likely to be at the side seam. Usually the second roll needs adjusting. To adjust, follow manufacturer's directions.

IV. DIRECTIONS FOR USING A PRESSURE CANNER**A. THREE RULES FOR SAFE USE OF PRESSURE CANNER**

1. Clean safety valve and petcock each day that the canner is used. Take apart, wash and dry parts. Use care not to damage the area of the safety valve where the ball sits, by contact with metal instruments or harsh cleansers. Spring tension must not be changed. Be careful that washcloth does not become entangled in spring and stretch it.
2. Have 2 to 3 inches of water in bottom of canner each time before using, so that it will not boil dry and cause damage.

If using canner with weight type of gauge use 3 quarts of water for 10 pounds pressure, and 4 quarts of water for 15 pounds pressure.

3. At end of processing time allow pressure to return to zero before opening canner.

B. CARE OF PRESSURE CANNER

The dial type pressure gauge and safety valve should be tested each year for accuracy, also when first purchased and if dropped or out of order. (See County Extension Agent.) Remove gauge and safety valve with wrench. When replacing, plumber's paste may be used on threads to assure a tight seal.

A rack is necessary in the bottom of the canner.

Wash and dry the canner after using, but do not place lid in water. Avoid getting water or grease into the pressure gauge. Be sure that the edges of the lid and the canner are clean at all times, in order to assure a steam tight seal. Avoid striking rim of canner with any hard instrument. Clean the safety valve and petcock each day after using. If openings are not clean, clean with toothpick. Store canner with lid upside down; tightly closed canner may develop an off-flavor. Before inverting the cover on the canner, cover the top of canner with heavy paper to prevent marring or roughening the sealing surface.

If the canner leaks steam at the edge of the lid, and the canner has a sealing ring or gasket, probably the gasket needs to be stretched and turned over. Remove gasket. Stretch gently. Turn it upside down and replace carefully. If stretched too much to fit, it will usually fit all right the next day. After replacing the sealing ring, press it with the fingers to a horizontal position. When putting lid on the canner the next time, press the lid down firmly with the hand.

New gaskets are obtainable from manufacturer of canner for a small charge. To avoid delay, keep a spare on hand.

To remove discoloration from canner, add water up to line of discoloration. Add 1 tablespoon cream of tartar per quart. Raise pressure to 15 pounds and remove from heat. Let stand overnight. Empty next morning and scour with a good cleaner that does not contain alkali, potash, or lye.

C. PRECAUTIONS ABOUT VARIOUS TYPES OF PRESSURE CANNERS AND ACCESSORIES

Pressure canner with lugs or clamp fasteners for lid. Be sure that all clamps are securely in place. Tighten evenly clamps on opposite sides of canner until they begin to catch. Repeat with other opposite pairs of clamps until all have

been turned part way down. Then turn all clamps tight without use of pliers. If canner stands after pressure returns to zero, the lid may be hard to get off. To loosen it place a stick of wood against the lid and tap the other end of the stick. Have any defective clamps replaced before using the canner.

Pressure canner with cover that slides into place. Be sure that canner is properly closed. To do so find words "Closed" and "Open" on top rim of canner and turn this side toward you. Place lid in such a position that the arrow on lid points to the word "Open" on rim of canner. Turn lid clockwise until arrow points to the middle of the word "Closed." Never develop pressure until cover of canner is in this exact position.

When available a thermometer can be installed on any canner and is desirable equipment because it indicates the degree of heat within the canner. The pressure gauge does not register temperature.

D. STEPS IN USING THE PRESSURE CANNER WITH GLASS JARS

1. Place the rack in the bottom of the canner.
2. Pour water in the pressure canner until it reaches a depth of at least 2 inches each time used. Use hot water for hot jars. Use lukewarm water for cold jars.
3. Prepare jars as described, pages 4, 5, 6, and 7.
4. Place filled jars on rack in canner. Do not let them touch or tip. Keep jars level.
5. Open steam cock.
6. Fasten cover in position, according to type.
7. Apply heat under canner.
8. Heat until steam escapes steadily and vigorously from the open cock. Let steam escape freely for 10 minutes if canner is size that holds 7 quart jars, to insure that all air has been driven out of the canner. Otherwise the pressure gauge may indicate air pressure, not steam pressure within, and the temperature will be lower than the pressure gauge indicates. Steam pressure, not air pressure, is required to produce a high temperature.
9. Close the petcock and continue heating until the desired pressure or temperature is reached. Bringing the pressure up quickly improves quality of the product. At altitudes of

- 2,000 feet or above, more pressure is needed. See Table 1, page 20.
10. Begin to count cooking time when the gauge registers the correct pressure.
 11. When the correct pressure is reached, reduce the heat or move the canner back on the stove. With electric stove, reduce heat slightly before proper pressure is reached. It is important that the pressure *remain constant*. Fluctuation of pressure draws juice from jars. In using a wood range, a mat or rack may be placed under the canner to keep the heat even.
 12. When the cooking time is up, remove the canner from the stove and let it cool slowly *until the gauge reaches zero*. Do not try to rush the cooling by fanning or pouring on cold water. To do so may crack the canner. Slow cooling of the canner aids retention of juice in jars at this stage of operation. When pressure returns to zero, wait a minute or two, then open the steam cock gradually. If steam comes out close it and wait until this does not occur. Do not confuse the hissing sound of air going into the canner with the sound of steam coming out. If steam cock is opened wide immediately, liquid may be drawn from the jars.
 13. When the hissing has stopped, open the canner, following directions for each type. Remove the cover, tilting the far side up so that the hot vapor escapes away from you. Remove jars as soon as violent bubbling within the jars stops, using a large dry cloth between you and jar, in case a defective jar should break. Avoid drafts when removing jars. Tighten the lids at once unless of self-seal type. Cool jars quickly, set apart, but avoid placing in drafts or on a cold wet surface. Test the seal before storing. In case of leakage, reprocess the full length of time, or use.

E. STEPS IN USING PRESSURE CANNER WHEN CANNING IN TIN CANS

1. Clean and prepare product.
2. Examine can. Straighten any cans that have dented rims. Discard cans with torn side seams.
3. Mark can with soft or china marking pencil, sharp instrument or tin can ink, with name, date, method, and processing batch.
4. Pack product in the marked cans. Pack cold or hot accord-

ing to directions given below under 5 and 6. Fruit, tomatoes, meat, and fish may be packed cold or hot. Nonacid vegetables should be packed hot. When cans are filled with cold products, they must be heated before sealing.

5. *Cold Pack.* May be used with fruit, tomatoes, meat, and fish.
 - a. Fill the cans with food. Avoid a tight dry solid pack. Use plenty of sirup on fruits. Tomato juice may be added to tomatoes.
 - b. Add boiling sirup to fruits to within $\frac{1}{8}$ to $\frac{1}{4}$ inch of the top of the cans. Add only salt to fish and meat.
 - c. Exhaust or preheat the can. To exhaust, heat the filled cans in a pan of boiling water reaching to within 1 to $1\frac{1}{2}$ inches of the top of the cans, until the temperature of the center of the cans is approximately 180° F. For dense, cold products this may take 20 to 40 minutes. Keep the exhausting pan covered. The purpose of this preheating is to expand the contents of the can so that expansion after sealing will not be sufficient to strain the seams or buckle the ends of the cans; also to expel the air from the product, and to prevent corrosion of the tin.
 - d. When the cans are sufficiently heated, or exhausted, seal them promptly on the tin can sealer. Follow manufacturer's directions with the sealer.
 - e. Process immediately after sealing. Process meat and fish in pressure canner. Process fruit in hot water bath.
6. *Hot Pack*
 - a. Pack all nonacid vegetables boiling hot. Pack precooked meat hot. Fill cans to within $\frac{1}{8}$ to $\frac{1}{4}$ inch of the top.
 - b. Add boiling water in which they were cooked, to within $\frac{1}{8}$ to $\frac{1}{4}$ inch of the top of the can. Headspace should not exceed $\frac{1}{4}$ inch. Excessive headspace may cause darkening of some foods and corrosion of cans. Add salt in the proportion of $\frac{1}{2}$ teaspoon per pint of vegetables and 1 teaspoon per pint of meat.
 - c. Seal each can directly after filling. Follow directions with sealer.
7. When a batch of cans is sealed, place the cans in the pressure canner immediately. Have the canner ready with the hot

water 2 to 3 inches deep in cookers of 7-quart-jar capacity and dial gauge.

Heat penetration to center of can is aided by placing cans so that layers of food within the cans are vertical. Tin cans of spinach should be laid on their sides; cans of asparagus stalks and whole beans should stand upright.

8. Place the cover on the canner. Follow directions for each type of canner.
9. As soon as the desired pressure is reached write down the time when the processing is to be finished. Process at the necessary temperature for the required length of time. (See Tables 1 and 2, pages 20 and 23.)
10. When the cooking time is up, open the steam cock wide except under the following three conditions when a sudden release of pressure might result in buckling of the cans: (1) When pumpkin, corn, or spinach is being cooked. (2) If cans are larger than No. 2. (3) When the cans were sealed at too low a temperature. Under the conditions indicated, lower the pressure gradually.
11. When the gauge indicates zero, open the cooker and remove the cans.
12. Cool the cans completely and quickly by placing them under cold running water. Watch for leakage from poor seams.
13. Observe cans for at least 2 weeks to see if bulges or leaks appear. If any spoilage develops, examine all the cans that were processed in the same batch.
14. Label and store in the coolest place available, above freezing. The storage place should be dry enough to prevent rusting of cans.

V. HOW TO PRESERVE FOOD VALUE WHEN CANNING

Can foods very soon after they are gathered. Handle them in small lots at a time. Proceed rapidly with every step of the canning process. Keep food cool and ventilated before canning. Precook foods for a short time. Pack them hot. Process them in the containers rather than in the open kettle. Expose them as little as possible to the air, especially after peeling or cutting.

Use the liquid in which they were precooked to fill the container. Use this liquid when the can or jar is opened. It is good food.

Freezing often preserves food values better than canning.

VI. GENERAL DIRECTIONS FOR PREPARING VEGETABLES FOR CANNING

Safety insurance. All home-canned low-acid and nonacid foods should be removed from jar and brought to and maintained at a "rolling boil" for 10 minutes before tasting. Exceptions to the above recommendation are when the food is in large pieces or at high altitudes, in which case the boiling time should be increased to 15 minutes. Either cover the pan or stir the product to break up the lumps to insure even distribution of heat.

A. PROCEDURE IN CANNING VEGETABLES (except tomatoes).

See processing timetable 1, page 20.

1. Use not larger than quart jars. Pint size is recommended because of better heat penetration. Wash all jars in clean soapsuds and rinse. Let stand in hot water before packing so that jars will be hot when packed.

2. Gather vegetables when they are young and tender. Can as soon after picking as possible. Gather in shallow ventilated containers and keep cool and ventilated. Gather and can only small quantities at a time. Two hours from garden to can is a good rule. If you buy food to can, try to get local produce if available. Insist on freshness.

3. Prepare as for cooking. Wash thoroughly. Soil contains some of the bacteria that are hardest to kill, including botulinus organisms. Wash small lots at a time, in several waters if necessary. But do not soak food in water or bruise it. Lift food out of water, instead of pouring water off.

Cream style corn is prepared by cutting off tips of kernels and scraping out pulp. *Peas* may be shelled by dipping in hot water and running through wringer, stem end first. *Pumpkin and squash* may be baked or steamed until easily removed from the shell. *Sieved spinach* for infants should be packed in $\frac{1}{2}$ -pint jars. Asparagus scales are often trimmed off for greater cleanliness.

4. Precook food in boiling water until wilted and heated through. The quick heating shrinks food so that more will go into the jars. Also packing it hot assures better keeping quality. For corn, use half as much water as corn. *Mushrooms* should be peeled and dropped into cold water containing 1 tablespoon vinegar per quart; then precooked 3 to 4 minutes in boiling water that contains 1 tablespoon vinegar and 1 teaspoon salt per quart.

5. Pack hot into hot jars. Use an adequate amount of liquid in packing, as liquid aids heat penetration. Pack food fairly loose as it

is hard for heat to get to the center of a tight pack, especially greens, pumpkin, corn, and other foods of compact or viscous character. Add liquid in which cooked. Leave 1 inch vacant space at top of jars and $\frac{1}{2}$ to $\frac{1}{4}$ inch at top of tin cans. Add $\frac{1}{2}$ teaspoon salt per pint. Remove any particles from the sealing surface of the jar with a clean cloth.

The addition of small quantities of acid, such as vinegar or lemon juice, to a nonacid food, such as vegetable or meat, does not change the acidity enough to prevent the growth of dangerous bacteria. Bacteria will not grow, however, if enough acid is added to pickle the food.

6. If self-seal lids are used, screw down firmly tight. If using jars with separate rubber bands, partly seal jars. See directions for each jar, pages 4, 5, 6, and 7.

7. Process in pressure canner. See directions, page 9, and timetable 1, page 20.

8. At end of processing period, remove jars and seal, unless of self-seal type. See directions, page 12, for removing jars from canner.

B. DIRECTIONS FOR PREPARING CERTAIN VEGETABLES FOR CANNING

For important detailed instructions on canning in glass, read pages 3-8.
For instructions on canning in tin, read pages 8-9.

Asparagus

Wash asparagus; trim off scales if desired and tough ends and wash again. Cut into 1 inch pieces. Cover with boiling water. Boil 2 or 3 minutes. Pack hot asparagus in glass jars to $\frac{1}{2}$ inch of top. Cover with hot cooking liquid or if liquid contains grit, use boiling water. Leave $\frac{1}{2}$ inch space at top of jar. Add $\frac{1}{2}$ teaspoon salt to pints; 1 teaspoon to quarts. Process in pressure canner at 10 pounds (240° F.); pint jars 30 minutes—quart jars 45 minutes.

Pack hot asparagus in plain tin cans to $\frac{1}{4}$ inch of top. Fill to $\frac{1}{4}$ inch from top with hot cooking liquid, or if liquid contains grit, use boiling water. Add $\frac{1}{2}$ teaspoon salt to No. 2 cans; 1 teaspoon to No. 2½ cans. Exhaust and seal cans. Process in pressure canner at 10 pounds pressure (240° F.); No. 2 cans, 25 minutes; No. 2½ cans, 30 minutes.

Beans, fresh Lima

Can only young, tender beans. Shell, wash. Cover beans with boiling water and bring to boil. Pack hot beans in glass jars to 1 inch of top. Cover with boiling cooking liquid, leaving 1 inch space at

top of jar. Add $\frac{1}{2}$ teaspoon salt to pints; 1 teaspoon to quarts. Process in pressure canner at 10 pounds pressure (240° F.); pint jars, 45 minutes; quart jars, 60 minutes.

Pack hot beans in plain tin cans to $\frac{1}{2}$ inch of top. Fill to $\frac{1}{4}$ inch from top with boiling cooking liquid. Add $\frac{1}{2}$ teaspoon salt to No. 2 cans; 1 teaspoon to No. 2 $\frac{1}{2}$ cans. Exhaust and seal cans. Process in pressure canner at 10 pounds pressure (240° F.); No. 2 cans, 40 minutes; No. 2 $\frac{1}{2}$ cans 45 minutes.

Beans, snap

Wash beans. Trim ends; cut into 1 inch pieces. Cover with boiling water; boil 5 minutes. Pack hot beans in glass jars to $\frac{1}{2}$ inch of top. Cover with hot cooking liquid, leaving $\frac{1}{2}$ inch space at top of jar. Add $\frac{1}{2}$ teaspoon salt to pints; 1 teaspoon to quarts. Process in pressure canner at 10 pounds pressure (240° F.). Process pint jars 30 minutes, quart jars 40 minutes.

Pack hot beans in plain tin cans to $\frac{1}{2}$ inch of top. Fill to $\frac{1}{4}$ inch from top with hot cooking liquid. Add $\frac{1}{2}$ teaspoon salt to No. 2 cans; 1 teaspoon to No. 2 $\frac{1}{2}$ cans. Exhaust and seal cans. Process in pressure canner at 10 pounds pressure (240° F.); No. 2 cans, 25 minutes; No. 2 $\frac{1}{2}$ cans, 30 minutes.

Beets

Sort for size. Cut off beet tops, leaving an inch of stem. Also leave root. Wash beets. Cover with boiling water and boil until skins slip easily—15 to 25 minutes, depending on size. Skin and trim. Leave baby beets whole. Slice medium or large beets; halve or quarter very large slices.

Pack hot beets in glass jars to $\frac{1}{2}$ inch of top. Cover with boiling water, leaving $\frac{1}{2}$ inch space at top of jar. Add $\frac{1}{2}$ teaspoon of salt to pints; 1 teaspoon to quarts. Process in pressure canner at 10 pounds pressure (240° F.); pint jars 40 minutes, quart jars 45 minutes.

Pack hot beets in enameled tin cans to $\frac{1}{2}$ inch of top. Fill to $\frac{1}{4}$ inch of top with boiling water. Add $\frac{1}{2}$ teaspoon salt to No. 2 cans; 1 teaspoon to No. 2 $\frac{1}{2}$ cans. Exhaust and seal cans. Process in pressure canner at 10 pounds pressure (240° F.); No. 2 cans 30 minutes, No. 2 $\frac{1}{2}$ cans 35 minutes.

Beets pickled

Prepare beets as above. Prepare a sirup of 2 cups of vinegar (or 1 $\frac{1}{2}$ cups vinegar and $\frac{1}{2}$ cup water) to 2 cups sugar. Heat to boiling. Pack hot beets in glass jars to $\frac{1}{2}$ inch of top. Cover with boiling

pickling sirup, leaving $\frac{1}{2}$ inch space at top of jar. Add $\frac{1}{2}$ teaspoon salt to pints, 1 teaspoon to quarts. Process in boiling water; pint jar 30 minutes, quart jars 30 minutes. Do not pack in tin.

Carrots

Wash and scrape carrots. Slice or dice. Cover with boiling water and bring to boil. Pack hot carrots in glass jars to $\frac{1}{2}$ inch of top. Cover with hot cooking liquid, leaving $\frac{1}{2}$ inch space at top of jar. Add $\frac{1}{2}$ teaspoon salt to pints; 1 teaspoon to quarts. Process in pressure canner at 10 pounds pressure (240° F.); pint jars 40 minutes, quart jars 45 minutes.

Pack hot carrots in plain cans to $\frac{1}{4}$ inch of top. Fill to $\frac{1}{4}$ inch of top with hot cooking liquid. Add $\frac{1}{2}$ teaspoon salt to No. 2 cans; 1 teaspoon to No. 2 $\frac{1}{2}$ cans. Exhaust and seal cans. Process in pressure canner at 10 pounds pressure (240° F.); No. 2 cans 30 minutes, No. 2 $\frac{1}{2}$ cans 35 minutes.

Corn, cream-style

Husk corn and remove silk. Wash. Cut corn from cob at about center of kernel and scrape cobs. To each quart of corn add 1 pint boiling water; heat to boiling. Pack hot to 1 inch of top. Add $\frac{1}{2}$ teaspoon salt to each jar. Process in pressure canner at 10 pounds pressure (240° F.); pint jars 95 minutes; use of larger jars not recommended for cream style corn.

Use No. 2 cans, enameled or plain. Pack hot to $\frac{1}{4}$ inch of top. Add $\frac{1}{2}$ teaspoon salt to each can. Exhaust and seal cans. Process in pressure canner at 10 pounds pressure (240° F.); No. 2 cans 100 minutes. Use of larger cans not recommended for corn.

Corn, whole-kernel

Husk corn and remove silk. Wash. Cut only 1 or 2 rows of kernels from the cob at each stroke using a short, sharp blade to keep kernels whole. Wash kernels to remove free starch. If this is not done, even a very little starch may thicken during processing and such corn would require cream style processing schedule.

To each quart of corn add 1 pint boiling water. Heat to boiling. Pack hot corn in glass jars to 1 inch of top. Cover with hot cooking liquid, leaving 1 inch space at top of jar. Or fill to 1 inch of top with mixture of corn and liquid. Add $\frac{1}{2}$ teaspoon salt to pints; 1 teaspoon to quarts. Process in pressure canner at 10 pounds pressure (240° F.); pint jars 75 minutes, quart jars 80 minutes.

Pack hot corn in tin cans to $\frac{1}{2}$ inch of top and fill to $\frac{1}{4}$ inch of top with hot cooking liquid, or fill to $\frac{1}{4}$ inch of top with mixture of

hot corn and liquid prepared as in previous paragraph. Add $\frac{1}{2}$ teaspoon salt to No. 2 cans; 1 teaspoon to No. 2 $\frac{1}{2}$ cans. Exhaust and seal cans. Process in pressure canner at 10 pounds pressure (240° F.); No. 2 cans 60 minutes, No. 2 $\frac{1}{2}$ cans 70 minutes.

Greens (spinach, chard, beet-tops, etc.)

See *Spinach* for details.

Peas, green

Shell and wash peas. Cover with boiling water. Bring to boil. Pack hot peas in glass jars to 1 inch of top. Cover with boiling water, or water in which vegetables were precooked, leaving $\frac{1}{2}$ inch space at top of jar. Add $\frac{1}{2}$ teaspoon salt to pints; 1 teaspoon to quarts. Process in pressure canner at 10 pounds pressure (240° F.); pint jars 45 minutes, quart jars 50 minutes.

In tin cans, pack hot peas to $\frac{3}{4}$ inch of top. Fill to $\frac{1}{4}$ inch of top with boiling water or water in which vegetables were precooked. Add $\frac{1}{2}$ teaspoon of salt to No. 2 cans; 1 teaspoon to No. 2 $\frac{1}{2}$ cans. Exhaust and seal cans. Process at 10 pounds pressure (240° F.); No. 2 cans 35 minutes, No. 2 $\frac{1}{2}$ cans 40 minutes.

Pumpkin or Squash strained

Wash, cut in half and remove seeds. Cut into large pieces. Steam until tender, about 25 minutes. Scrape from shell with a large spoon. Put through food mill or strainer if desired. Simmer until heated through, stirring to keep from sticking to pan. Pack hot in glass jars to $\frac{1}{4}$ inch of top. Add no liquid or salt. Process at 10 pounds pressure (240° F.); pint jars 85 minutes, quart jars 100 minutes.

Pack hot in tin cans to $\frac{1}{4}$ inch of top. Add no liquid or salt. Exhaust and seal cans. Process in pressure canner at 10 pounds pressure (240° F.); No. 2 cans 75 minutes, No. 2 $\frac{1}{2}$ cans 90 minutes.

Sauerkraut

See page 29.

Spinach

Can only freshly picked, tender spinach. Sort and wash thoroughly. Cut out tough stems. Heat in large kettle with just enough water to prevent sticking. When steam comes through spinach, turn spinach over to hasten wilting and prevent overcooking. When thoroughly wilted and very hot, place hot spinach loosely in glass jars

to $\frac{1}{2}$ inch of top. Cover with boiling water, leaving $\frac{1}{2}$ inch space at top of jar. Add $\frac{1}{4}$ teaspoon salt to pints. Process in pressure canner at 15 pounds pressure (250° F.); pint jars 55 minutes.

Place hot spinach in plain tin cans loosely to $\frac{1}{4}$ inch of top. Fill to top with boiling water. Add $\frac{1}{4}$ teaspoon salt to No. 2 cans; $\frac{1}{2}$ tea-

Table 1.
TIMETABLE FOR CANNING VEGETABLES
See page 15 for preparation of vegetables.

Product	Pack	Pressure	Jars		Tin cans	
			Pints	Quarts	No. 2	No. 2½
		Pounds	Minutes	Minutes	Minutes	Minutes
Asparagus	Hot pack	10	30	45	25	30
Beans, snap	Hot pack	10	30	40	25	30
Beans, Lima	Hot pack	10	45	60	40	45
†Beets, baby	Hot pack	10	40	45	30	35
Carrots, baby	Hot pack	10	40	45	30	35
‡†*Corn, whole grain ..	Hot pack	10	75	80	60	70
†Corn, cream style ..	Hot pack	10	95	....	100	....
Greens (spinach, chard, beet-tops, etc.)—(see SPINACH)						
Mushrooms	Hot pack	10	30	....	25	....
‡§Peas	Hot pack	10	45	50	35	40
Pumpkin and squash	Hot pack	10	85	100	75	90
Sauerkraut (see Table 3)						
†Spinach	Hot pack	15	55	....	50	55
Spinach (sieved)	Hot pack	15	60	....	55	....
Tomatoes (see Table 3)						

* Pack corn very hot and process immediately. Whole grain corn schedules require that corn be washed after cutting to remove starch. Otherwise use cream style schedule.

† When freezing facilities are available it is suggested that these vegetables be frozen to improve the quality and to avoid canning difficulties.

‡ Pack beets in enameled cans to protect color.

§ Pack corn and peas preferably in C enamel cans but plain cans are satisfactory.

Altitude adjustment

In using the pressure canner above sea level, add 1 pound pressure for each 2,000 feet. Process for same length of time as given in the table.

Where 10 pounds pressure is indicated, temperature should be 240° F; 15 pounds, 250° F.

Caution: All home-canned low-acid and nonacid foods should be removed from jar and brought to and maintained at a *rolling boil* for 10 minutes before tasting. Exceptions to this recommendation are when the food is in large pieces or at high altitudes, in which case the boiling time should be increased to 15 minutes. Either cover the pan or stir the product to break up the lumps to insure even distribution of heat. Canned food showing any signs of spoilage should be burned, or mixed with 2 or 3 tablespoons of lye and buried. Avoid placing where animals can find it.

spoon to No. 2½. Exhaust and seal cans. Process in pressure canner at 15 pounds pressure (250° F.); No. 2 cans 50 minutes, No. 2½ cans 55 minutes.

Tomatoes

See page 29.

VII. DIRECTIONS FOR CANNING MEAT, POULTRY, AND FISH

A. DIRECTIONS FOR CANNING MEAT

Meat is safely processed only in a pressure canner.

1. Wash jars and lids thoroughly in warm soapsuds and rinse well.

2. Cut meat into pieces of suitable size for serving and to fit the jar. Trim off excess fat. Remove large bones. Allow about 1¼ pounds of meat for each pint jar or No. 2 can.

3. Two methods of packing meat: hot and cold.

Packing meat hot assures better heat penetration, shrinks the meat, and results in fuller jars. The procedure is as follows:

Method 1

a. Make a broth by placing bones in cold water and simmering ½ hour. Place cut meat in broth and simmer until thoroughly heated through, about 12 to 20 minutes. Instead of simmering, meat may be seared, roasted, made into cakes or sausage and fried, stewed, or made into soup. Avoid starchy coatings, such as flour, crumbs, or thick gravy.

b. Pack the hot precooked meat in clean hot jars. Pack loosely. Add hot broth to 1 inch from top of jars and to ½ to ¾ inch from top of tin cans.

c. Add 1 teaspoon salt to each pint jar.

d. Remove grease or other food from sealing surfaces. Partly seal. (See directions for each jar, pages 4, 5, and 6.)

e. Place hot jars in hot pressure canner. Follow pressure canner directions, page 9. Follow processing timetable 2, page 23.

f. Seal after processing, all types of closures except self-sealing.

Method 2

a. Roast or sear the cut meat.

b. Pack in jars, add hot diluted pan drippings.

c. Follow directions c, d, e, f from Method 1.

Packing meat cold takes less time.

a. Place cut meat into clean cold jars to top of jar. Add 1 teaspoon salt per pint. Add no liquid.

- b. Partly seal. (See directions for each jar, pages 4, 5, and 6.)
- c. Process in pressure canner. Follow directions, page 9. Follow processing timetable 2, page 23.
- d. Seal jar after processing, all types of closures except self-sealing.

For canning meat in tin see instructions on page 23.

B. DIRECTIONS FOR CANNING POULTRY AND RABBITS

1. Wash jars and used tops thoroughly in warm soapsuds and rinse well.

2. Cut cleaned chicken into pieces as for frying. Remove flesh from breast and back. Retain other bones. Use neck, wing tips, and breastbones for broth. Heart and gizzard may be canned with the rest, but not the liver and kidneys. The giblets may be canned separately for use in gravies and dressing.

3. Chicken may be canned raw, precooked 8 to 10 minutes, fried, or roasted. Pan drippings may be used. Avoid use of thickened gravies. To pack chicken, place a drumstick in a 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. Fit in remaining pieces to fill lower part of jar. Cover with breast meat.

4. Rabbits may be skinned and canned. Follow same directions as for poultry in Table 2.

5. Follow directions for canning meat and poultry given above and Table 2, page 23.

The steam pressure canner is the only method recommended for canning poultry.

C. DIRECTIONS FOR CANNING FISH

1. Wash jars and used tops thoroughly in warm soapsuds and rinse well.

2. Can only absolutely fresh fish. Remove head, tail, scales, entrails, and any dark membrane. Better quality product results if salmon is eviscerated as soon as caught. Scales may be loosened by pouring boiling water over them and scraping backwards. Retain the skin and bones of salmon for flavor, color, and food value. Tuna skin is usually discarded for better appearance. In commercial canning the fat of tuna is removed by baking or steaming 2 to 4 hours until the natural oil has separated from the muscle. Tuna oil is discarded as it imparts a strong flavor. Cooking and cooling allows easy removal of bones.

3. Cut large fish into convenient sized pieces for serving and for packing into jars. Pack raw or cooked to top of jar. Trout and

smelt may be browned in hot fat and packed in diluted pan drippings. Pack small fish in an up-and-down direction. Salmon is usually packed raw.

4. Add salt, 1 teaspoon per pint. If desired, or if fish is not fat, add 2 tablespoons salad oil or a piece of fat flesh from near neck of salmon to each pint jar. Add no other liquid. Olive or high grade salad oil should be added to precooked tuna, using 2 tablespoons per pint.

Table 2.
TIMETABLE FOR CANNING MEATS, POULTRY, AND FISH

See pages 21-22 for complete directions.

Meats should be processed in pressure canner.*

Product	Pack	Jars			Cans	
		Steam	Pint	Quart	No. 2	No. 2½
		Pounds	Minutes	Minutes	Minutes	Minutes
Beef, veal, lamb, mutton, venison	Hot pack	15	80	95	75	90
	Raw pack	15	80	100	80	95
Chicken, with bones	Hot pack	15	65	75	65	65
	Raw pack	15	75	85	75	75
Chicken, boned...	Hot or raw pack	15	100	110	100	100
Pork	Hot pack	16	85	120	85	110
	Raw pack	15	110	130	85	120
Pork, sausage ...	Hot pack	15	90	120	90	100
	Raw pack	15	110	130	110	120
Rabbit (same as chicken)						
Clams	Whole, raw	10	80	....	80	....
Clams	Mincied, raw	10	100	....	100	....
†Crabs	Cold pack	10	100	....	100	....
†Oysters	Raw pack	10	60	....	60	....
†Salmon	Raw pack	10	100	....	100	....
†Smelt and trout	Hot or raw pack	10	100	....	100	....
†Tuna fish	Cold pack	10	100	....	100	....

* *Altitude adjustment:* The following modification for altitude is recommended. For each 2,000 feet above sea level, add 1 pound pressure. Process the food for the same length of time given in this table.

† For detailed instructions on preparation and packing see Station Circular 164, *Preservation of Seafoods.*

Caution: All home-canned low-acid and nonacid foods should be removed from jar and brought to and maintained at a *rolling boil* for 10 minutes before tasting. Exceptions to the above recommendation are when the food is in large pieces or at high altitudes, in which case the boiling time should be increased to 15 minutes. Either cover the pan or stir the product to break up the lumps to insure even distribution of heat. Canned food showing any signs of spoilage should be burned, or mixed with 2 or 3 tablespoons of lye and buried. Avoid placing where animals can find it.

5. Thoroughly clean sealing surfaces of jars. Partly seal jars of all types of closures except self-sealing. (See directions for each type of jar, pages 4, 5, and 6.)

6. Process in pressure cooker. Follow directions for pressure canner, pages 11 and 12. Follow processing table, page 23.

CAUTION

All home-canned low-acid and nonacid foods should be removed from jar and brought to and maintained at a "rolling boil" for 10 minutes before tasting. Exceptions to this recommendation are when the food is in large pieces or at high altitudes, in which case the boiling time should be increased to 15 minutes. Either cover the pan or stir the product to break up the lumps to insure even distribution of heat.

VIII. DIRECTIONS FOR CANNING FRUITS AND TOMATOES

For equipment, see pages 4, 5, 6, and 7. Timetable 3 for different fruits is given on page 30.

A. PROCEDURE IN CANNING FRUIT

1. Use firm sound fruits that are well ripened. Freshness means improved food value, flavor, appearance, and keeping qualities. Tree-ripened peaches and box-ripened pears are best. To prevent crushing soft varieties such as berries, gather in shallow containers. Soft but sound fruit may be set aside for juice or jam.

2. Most fruit should be carefully washed. Prepare as for the table. Fruits that are peeled, such as pears, apples, and peaches, may be dipped in a weak salt solution after peeling to prevent discoloration at this stage. Use approximately 4 level teaspoons of salt to 1 gallon of cold water. Addition of 2 tablespoons of vinegar to this water may further aid in color retention.

Rinse in cold water before canning if desired. Rinse may be omitted.

Fruits that shrink a great deal in the jar, such as apples and apricots, may be precooked about 5 minutes in sirup, packed hot, and processed in boiling water bath for a shorter period. Precooking in sirup is effective in preventing browning of pears, peaches, apples, and other cut fruits. Each quart jar of fruit requires about 1 cup of sirup. Amount will vary with tightness of pack.

Some fruits when heated yield enough juice of their own without adding liquid. Adding sugar before heating will draw out juice. Adding sirup made with water produces a milder flavor.

STEPS IN CANNING BY HOT WATER BATH METHOD

By this method food is cooked in the jars.

Cooking in the jars results in less contact with air and conserves vitamins better than the open kettle method. This method also results in less spoilage than the open kettle method. Products tend to be firmer, more palatable, and more attractive by the boiling water bath method.

1. Fill boiling water bath cooker with enough water to come 1 inch over tops of jars. Start heating so that water will be boiling when jars are packed.
2. Shortly before they are needed, thoroughly wash jars and lids in clean soapy water and rinse well. If jars have rubber rings, prepare as described on page 4 and attach them. Let jars lie on a rack or perforated tin covers in hot water so that they will be hot when packed.
3. Prepare sirup according to Table 4, page 31.

Light sirup (25 per cent): 1 cup of sugar to 3 cups of water.

Medium sirup (33 per cent): 1 cup of sugar to 2 cups of water.

Heavy sirup (50 per cent): 1 cup of sugar to 1 cup of water.

Table 4, page 31, suggests type of sirup for each fruit. Strength of sirup may vary according to taste or circumstances. Too much sugar tends to draw juice from fruit, causing more shrinking and floating in jar.

Honey may replace half of the sugar but may impart a strong honey flavor. Corn sirup or corn sugar (dextrose) may replace one-third of the sugar ($\frac{1}{3}$ in jams and jellies). Avoid brown sugar and sirups with strong flavors.

Sugar is not necessary to keep fruit from spoiling but it helps retain shape, color, and flavor of fruit. Unsweetened fruit may be canned the same as sweetened fruit, adding water or fruit juice or heating slowly to form its own juice. It may be sweetened to taste when served, but is not as satisfactory as when canned with sugar.

4. Place fresh or precooked fruit in hot jar while jar is standing in hot water. Jar may be jolted gently on a wooden surface or the palm of the hand to help make a full tight pack. Avoid mashing fruit. Fill jars to top with fruit. Pour boiling hot sirup over fruit. Allow $1\frac{1}{2}$ inches head space for sirup with raw fruit and 1 inch head space with partly cooked fruit. Allow $\frac{1}{4}$ to $\frac{1}{2}$ inch head space in tin cans. Run knife inside walls of jar to release air. Remove any particles from sealing surface of jar.

5. Place hot lids on jars. If self-seal type, screw lids down tight. If wire-clamp type, snap the larger clamp into place and leave the smaller clamp up, to seal jar partly. If using screw top with rubber ring, screw lid down, then back $\frac{1}{4}$ turn to seal jar partly. Process promptly.
6. Lower hot jars into boiling hot water with jar lifter or rack. Jars should be $\frac{1}{2}$ inch or more apart and rack underneath should raise them off the bottom. Water level should be 1 inch or more above tops of jars. Cover cooker. Record time when water comes to a rolling boil again.
7. Keep water boiling actively for required period, counting from time water boils again. Add boiling water if needed to keep jar tops covered. Add time for altitude of 1,000 feet and more. (See Table 3, page 30.)
8. Remove jars from hot water bath at end of processing period and seal unless self-seal type.

C. CANNING FRUIT BY OPEN KETTLE METHOD

By the open kettle method, the food is cooked in an ordinary kettle, then packed into sterilized jars and sealed. No other processing is done. Bacteria, molds, and yeasts can get into the jars when they are being filled and may cause spoilage. For this reason the federal and state nutrition committees recommend that the open kettle method be used only for such products as jams, jellies, preserves, and pickles.

D. DIRECTIONS FOR PREPARING AND CANNING CERTAIN FRUITS, TOMATOES, AND SAUERKRAUT.

See Table 3, page 30 for time tables. For canning in tin, see page 8.

Apples

Wash, pare, and core apples. Cut in pieces not more than 1 inch thick. To keep fruit from darkening, drop it immediately after peeling into cold water containing 4 teaspoons salt per gallon. Drain, then boil 5 minutes in medium sirup. Pack hot fruit into jars to $\frac{1}{2}$ inch of top. Cover with hot sirup, leaving $\frac{1}{2}$ inch space at top of jar. Adjust jar lids. Process in boiling water bath 10 minutes. In tin cans, pack hot fruit to $\frac{1}{4}$ inch from top. Fill to $\frac{1}{4}$ inch from top with hot sirup. Seal cans and process in boiling water bath 10 minutes.

Applesauce

Make applesauce, sweetened or unsweetened. Heat through, stirring to keep it from sticking to the pan. Pack hot to $\frac{1}{4}$ inch from top of jar. Adjust lid. Process 10 minutes in boiling water bath.

Baked Apples

Bake as for serving. Pack hot. Fill jar to $\frac{1}{2}$ inch of top with thin sirup. Process 10 minutes in boiling water bath.

Apricots

Follow method for peaches. Peeling may be omitted.

Berries, soft: red raspberries and others

Sort, wash, and drain. Pack raw to top of jars. Shake or jolt jar for a fuller pack. Avoid mashing. Add boiling medium or heavy sirup to $1\frac{1}{2}$ inches from top of jar or to $\frac{1}{4}$ inch from top of can. Process in boiling water bath 15 minutes.

Berries, firm: blueberries, blackberries, gooseberries, loganberries

a. Cold pack. Sort, stem, wash, and drain. Fill jars to $\frac{1}{2}$ inch from top. Shake or jolt for a fuller pack. Add boiling medium or heavy sirup to $\frac{1}{2}$ inch from the top of the jar or $\frac{3}{8}$ to $\frac{1}{4}$ inch from top of can. Place packed jars directly into boiling water if of modern standard glass. Process in boiling water bath 15 minutes for pints, 20 minutes for quarts. The hot pack produces fuller jars than cold pack.

b. Hot pack with dry sugar. Sort, stem, wash, and drain. Add $\frac{3}{4}$ cup sugar per quart, more for gooseberries if desired. Bring to a boil. Shake pan or stir gently to prevent sticking. Pack hot into hot jars, adding juice to $\frac{1}{2}$ inch from top of jar or to $\frac{1}{4}$ inch from top of can. Process in boiling water bath 10 minutes.

c. Hot pack with sirup. Bring berries to a boil in 1 cup heavy sirup per quart. Pack hot into hot jars to $\frac{1}{2}$ inch from top of jar or to $\frac{1}{4}$ inch from top of can. Process in boiling water bath 10 minutes.

Cherries

a. Cold pack. Wash, stem, pack raw into jars. Add boiling medium sirup to $\frac{1}{2}$ inch from top of jar or $\frac{3}{8}$ to $\frac{1}{4}$ inch from top of can. Jolt down in jar for a full pack when filling jars. Process jars in boiling water bath 25 minutes; No. 2 and $2\frac{1}{2}$ cans, 20 minutes.

b. Hot pack. Wash, stem, and pit. Stir in about $\frac{3}{4}$ cup sugar per quart and bring to a boil. Pack hot in hot jars to $\frac{1}{2}$ inch from top of jar or $\frac{3}{8}$ to $\frac{1}{4}$ inch from top of can. Process in boiling water bath 10 minutes. Hot pack produces fuller jars.

Peaches

Select tree ripened peaches. Cut in half, remove pit and immerse halves in boiling water one minute or until skins slip easily. Dip quickly in cold water. Remove skins. Slice if desired.

a. Hot pack. Heat peeled peaches through in hot sirup (4 to 8 minutes). Pack halves with pitted sides down in overlapping layers, to $\frac{1}{2}$ inch of top of jar. Add boiling sirup to $\frac{1}{2}$ inch from top of jar or $\frac{1}{4}$ to $\frac{1}{2}$ inch from top of can. (One cracked pit may be added to each quart of sirup to add flavor. Strain sirup before using.) Process in boiling water bath for 20 minutes.

b. Cold pack. Pack raw peeled fruits into hot jars to $\frac{1}{2}$ inch of top. Cover with boiling sirup, leaving $\frac{1}{2}$ inch space at top of jar. Process in boiling water bath for 25 minutes for pints, 30 minutes for quart jars and 25 to 30 minutes for No. 2 and No. 2 $\frac{1}{2}$ tin cans.

Pears

Pears should be removed from tree before ripe and stored in a cool place until ripe but not soft.

Can pears when ripe but firm. Pare, cut into halves, core with a teaspoon. To prevent darkening during preparation, drop fruit into cold water containing 4 teaspoons salt and 2 tablespoons vinegar per gallon. Drain just before heating or packing.

Continue as with peaches, either hot or cold pack. Process in boiling water bath. Hot pack 15 minutes for pints, 20 minutes for quarts. Cold pack 20 minutes for pints, 25 minutes for quarts.

Baked Pears

Place pears in pan with enough water to prevent sticking. Bake until tender. Pack into hot jars and cover with boiling sirup (medium) to $\frac{1}{2}$ inch from top of jar. Process in boiling water bath 15 minutes for halved pears, 20 minutes for whole pears.

Prunes or Plums

a. Cold pack. Wash, pack, cover with boiling heavy sirup to $\frac{1}{2}$ inch from top of jar or $\frac{1}{4}$ to $\frac{1}{2}$ inch from top of can. Pricking skins helps prevent bursting. Process in boiling water bath 15 minutes for pints, 20 minutes for quarts.

b. Hot pack. Add sugar or heavy sirup, as desired. Boil 3 to 5 minutes. Pack hot to $\frac{1}{2}$ inch from top of jar. Process in boiling water bath 10 minutes for pints and 15 minutes for quarts.

Rhubarb

a. Wash rhubarb and cut into $\frac{1}{2}$ inch pieces. Add $\frac{1}{2}$ cup sugar to each quart of rhubarb and let stand 2 or more hours to draw out juice. Heat slowly to boiling. Pack hot to $\frac{1}{2}$ inch from top of jar. Process in boiling water bath 10 minutes for pints or quarts.

b. Baked. Cut into $\frac{3}{4}$ inch lengths, add 1 cup sugar per quart, bake in covered dish until tender. Pack hot into hot jars. Process in boiling water bath 10 minutes.

c. Uncooked method. Use only if rhubarb is very fresh and not overripe. Cut, pack in sterilized jars, fill to overflowing with cold water, seal and store in very cool place without processing. Cook after opening jars.

Sauerkraut

Bring to simmering point, 190° F. to 200° F. Pack hot into hot jars to $\frac{1}{2}$ inch from top of jar or $\frac{1}{8}$ to $\frac{1}{4}$ inch from top of can. Process in boiling water bath 15 minutes for pints, 20 minutes for quarts.

Strawberries

Wash, hull, place in preserving kettle with sugar, using about $\frac{3}{4}$ cup sugar to 1 quart raw berries. Bring slowly to a boil and boil 1 to 3 minutes and let stand overnight or at least 12 hours. Boil one minute and pack hot in hot jars to $\frac{1}{2}$ inch from top of jar or $\frac{1}{4}$ to $\frac{1}{2}$ inch from top of can. Process in boiling water bath 10 minutes. This method helps to produce fuller jars and usually produces even distribution in jars after cooling.

Tomatoes

Blanch in boiling water to loosen skins. Then dip in cold water. Peel, quarter, and remove all green and white core.

a. Hot pack. Heat quartered tomatoes, just to boiling. Pack hot into hot jars to $\frac{1}{2}$ inch from top of jar. Run knife down sides of jar to remove air bubbles. Add 1 teaspoon salt per quart. Process in boiling water bath 10 minutes for pints or quarts.

b. Cold pack. Peel and carefully core tomatoes. Leave whole or cut in halves. Pack tomatoes to $\frac{1}{2}$ inch from top of jar or $\frac{1}{4}$ inch from top of can, pressing gently to fill spaces. Add no water. Add 1 teaspoon salt per quart. Process in boiling water 30 minutes for pints, 35 minutes for quart jars.

Tomato juice

Work with small batches at a time to save food value. Wash and cut tomatoes and simmer until softened. Do not boil. Avoid use of copper, brass, and iron utensils. Sieve quickly to avoid undue exposure to air and consequent reduction of vitamin content. Reheat at once to boiling point. Immediately fill hot jars or bottles to $\frac{1}{4}$ inch from top. Add $\frac{1}{2}$ to 1 teaspoon salt per quart. Process in boiling water bath 15 minutes.

Fruit juice

Wash fruit, crush, heat slowly to simmering point, about 190° F. to 200° F. Strain through thick clean cloth, add $\frac{1}{4}$ cup sugar to

each quart fruit juice, bring to simmering point but do not boil. Pour hot juice into containers to $\frac{1}{2}$ inch from the top of jar or $\frac{1}{4}$ inch from top of tin can. Avoid all contact with iron. Process in hot water bath at simmering point for 20 minutes.

Before using berry juice, a good general rule is first to dilute it from $\frac{1}{3}$ to $\frac{1}{2}$ with cold water and add sugar and lemon juice to taste. Use 1 part of loganberry juice to 6 or 7 parts of cold water and add sugar and lemon juice to taste.

Table 3.
TIMETABLE FOR CANNING FRUITS AND TOMATOES IN BOILING WATER BATH
See directions, page 24.

Fruits	Sirup	Pack Please follow recipes on pages 26-30	Water bath Process at boiling†				Kind of tin can. See directions on page 8.
			Jars*		Cans		
			Pint	Quart	No. 2	No. 2½	
			Minutes	Minutes	Minutes	Minutes	
Apples	Medium	Hot pack	10	10	10	10	Plain
Apricots	Medium	Cold pack	20	25	20	25	Plain
Berries—soft—red raspberries, strawberries	Medium or heavy	Cold pack	15	15	15	15	Fruit enam. Fruit enamel
		Hot pack	10	10	10	10	
Berries—firm (except raspber- ries and straw- berries)	Medium or heavy	Hot pack	10	10	10	10	Fruit enamel Fruit enamel
		Cold pack	15	20	15	20	
Cherries, sweet	Medium	Cold pack	25	25	20	20	Fruit enamel†
Cherries, sour	Medium or heavy	Hot pack	10	10	10	10	Fruit enamel† Fruit enamel†
		Cold pack	25	25	25	25	
Peaches	Medium	Hot pack	20	20	20	20	Plain Plain
		Cold pack	25	30	25	30	
Pears	Light	Hot pack	15	20	15	20	Plain Plain
		Cold pack	20	25	20	25	
Prunes or plums	Heavy	Hot pack	10	15	10	15	Fruit enamel, Fruit enamel
		Cold pack	15	20	15	20	
Rhubarb	Heavy	Hot pack	10	10	10	10	Fruit enamel
Sauerkraut		Hot pack	15	20	15	20	Plain
Tomatoes							
Quartered		Hot pack	10	10	10	10	Plain
Whole		Cold pack	30	35	30	40	Plain
Tomato juice		Hot pack	15	15	15	15	Plain
Fruit purees		Hot pack	20	20	20	20	Fruit enamel
Fruit juice		Hot pack	20 at simmering point		20 at simmering point		Fruit enamel

* For half gallon jars, add 5 minutes to time given for quarts.

† Use fruit enamel cans for dark and red cherries. Use plain cans for light cherries.

‡ Altitude adjustment: For each 1,000 feet above sea level, add 1 minute to processing time given in table above, if time called for is 20 minutes or less. If table calls for more than 20 minutes, add 2 minutes for each 1,000 feet.

Fruit purees

Fruit purees consist of fruit juice plus small particles of the fruit which have been forced through a sieve or similar device. Proceed as described for tomato juice except add enough water at first heating to prevent fruit from sticking to pan. Avoid all contact with iron. Fill hot containers with hot fruit puree and process in boiling water bath for 20 minutes.

Table 4. SIRUP FOR FRUITS

Sirup	Amount of sugar to liquid by volume or cupfuls	To make
Light	1 part sugar to 3 parts water or fruit juice	Mix and boil
Medium	1 part sugar to 2 parts water or fruit juice	until sugar
Heavy	1 part sugar to 1 part water or fruit juice	dissolves

IX. COOLING, TESTING SEAL, LABELING, AND STORING CANNED FOODS

Set jars in upright position out of draft several inches apart to cool rapidly. Do not tighten lids after cooling; to do so may break the seal. Lift jar by the body, not the top. Avoid pressure against rubber or any part of the seal.

Remove screw bands from self-seal jars after 24 hours. Test seal by gently tapping lids with spoon. Sealed lids usually have a ringing sound. Test seal of any that sound dull, applying a slight pull up on the lid. Scrub inside of screw bands with brush. Dry thoroughly and use again. Any jars not sealed should be reprocessed for full time or the food used.

Wipe good jars clean, label with name, date, type of processing, and period of processing. Store in cool, dark, dry, frostproof place with temperature of 45° to 60° F. if possible.

X. DISCOLORATION OF CANNED FOODS

Pink pears may be due to overcooking or to cooling too slowly due to placing too close together or in too warm a room. Overripe pears and some varieties pink more than others.

Tan or brown color of peaches, pears, apples, and apricots may be due to oxidation or too high temperature. Too much headspace may cause oxidation and discoloration. A good method to avoid browning of these cut fruits is to force the air out of them by boiling in sirup a few minutes before processing. Avoid pressure cooker

and oven canning. Too short a processing period may also cause a dark discoloration of top pieces in the jar. As soon as peeled, dip light colored fruits in cold brine. See page 28.

Cloudy peas or beans are often due to the presence of a few starchy overripe specimens, or to overcooking. (Bacteria may also cause cloudiness.)

Yellowish flakes or crystals in asparagus, turnip greens, and spinach are caused by natural ingredients in the vegetables and are harmless.

White sediment in tomatoes may be of two types, a harmless material, or bacteria causing spoilage.

Vegetables are sometimes discolored and often toughened by the use of hard water. If possible, obtain soft water for making brine and sirup.

Dark color in corn or meat may be caused by contact with copper or iron utensils. Corn is darkened sometimes by 15 pounds pressure canning. Too much head space may cause oxidation and discoloration.

XI. ON GUARD AGAINST SPOILAGE

Look closely at every jar of canned food before opening and when opened. Although food may be spoiled and give no indications, the following signs of spoilage are usually readily apparent.

1. Poor seal of jar. A leak.
2. Off-odor of food or off-color of food.
3. Change in texture of product: slippery, slimy, mushy, moldy.
4. Presence of gas. Spurting of liquid on opening.
5. Swelling or bulging jar tops and ends of tin cans.
6. Cloudiness of liquid. Overmature peas and beans, however, may be cloudy although not spoiled.
7. Off-flavor of food. *Do not taste nonacid home-canned foods before boiling them 10 to 15 minutes.* See caution at bottom of pages 20 and 23.

It is possible for canned food to contain the poison that causes botulism without showing it. Some foods that have this poison develop a bad odor when boiled. Absence of odor does not necessarily indicate freedom from botulinus poison.

When in doubt as to the wholesomeness of food, burn or bury it. Before burying, stir several tablespoons of lye into a jar of

spoilied canned food with a stick and let it stand 24 hours out of reach of children or animals. Then bury it deep—jar, cover, stick, and all.

Remember safety first. Don't expose people, poultry, or other animals to even one chance of tasting spoiled canned food.

Caution: All home-canned low-acid and nonacid foods should be removed from jar and brought to and maintained at a "rolling boil" for 10 minutes before tasting. Exceptions to the above recommendations are when the food is in large pieces or at high altitudes, in which case the boiling time should be increased to 15 minutes. Either cover the pan or stir the product to break up the lumps to insure even distribution of heat.

Do not use galvanized container. Metal poisoning may result.

XII. COMMON DIFFICULTIES IN CANNING

Most spoilage of canned food can be traced either to lack of adequate heat in processing, or to lack of airtight seal. Sometimes the food has spoiled before canning. The following precautions are emphasized:

1. Use sound fresh food of right maturity. Handle only enough for one cannerful at a time. Handle rapidly. Keep food cool and ventilated while waiting.

2. Examine jars before canning. Discard cracked jars and those with defects on sealing surface. Test jars with separate rubber ring by enclosing water and inverting. Thoroughly wash and rinse jars and tops.

3. Use only standard jars for canning if possible. Limit packers or commercial jars to such things as preserves and relishes. See page 7.

4. Keep jars level while processing to prevent food obstructing the seal.

5. Use the closure that was intended for each jar. See pages 4, 5, 6, and 7. Different kinds of closures are handled very differently. In general, follow the directions that come with each type of jar and each type of closure. Only partly seal jars with separate rubber rings before processing and tighten after processing. Avoid tightening self-seal jars after processing. Read and study directions for all canning equipment.

6. Have pressure canner gauge and safety valve tested when new, annually, and at any time that they show any irregularity. Follow the safety rules for pressure canner. See page 10. Be sure that the lid is securely fastened on pressure canner before developing

pressure. Allow adequate exhaust of air from pressure canner. Stay in the kitchen when using the pressure canner and keep the pressure steady.

7. When operating a canner, write down the time for *start* and *finish* of exhaust time and of processing time. If the temperature is not maintained at the specific point recommended in the tables for nonacid foods, there is always danger of food poisoning from botulism. Be sure to process the full time according to the table, or the food may spoil. At altitudes of 1,000 feet or higher, add time to hot water bath schedules. At altitudes of 2,000 feet and higher, add pressure to pressure canner schedules. See footnotes, pages 20 and 23.

8. Use pint jars for most nonacid foods in order to assure adequate heat penetration. Use a loose wet pack for vegetables to help heat penetration.

9. Leave adequate headspace so the food will not boil onto the sealing surfaces. Clean sealing surfaces well before closing jars.

10. Do not open jars after processing to fill them more completely. Avoid tightening lids after jars are cool. *Cool jars in upright position.*

11. Losses can often be prevented if the seals of jars are tested 24 hours after canning.

12. Know the operation and adjustment of tin can sealers if they are to be used. Test the seams frequently for airtight seal.

PRESERVATION OF VEGETABLES BY SALTING*

Salt draws water from vegetables by the process of osmosis, forming a brine that inhibits the growth of spoilage organisms. Vegetables may be salted in two ways: with a small proportion of salt that allows desirable fermentation, and with a larger proportion of salt that prevents fermentation. By either method some food value is lost.

Salt equivalents, level measurement: 1 tablespoon + 2 teaspoons = 1 ounce; $\frac{1}{2}$ cup = 5 ounces; 1 cup = 10 ounces; $1\frac{1}{2}$ cups = approximately 1 pound.

A. DRY SALTING WITH FERMENTATION

Cabbage, cucumbers, snap beans, beet tops, and turnip tops are the vegetables most frequently preserved by dry salting with fermentation.

Sauerkraut. Equipment needed: (1) A stoneware crock, a hardwood keg free from undesirable flavors and odors, or glass jars. (2) A good grade of dairy salt. (3) Scales. (4) Knives or kraut cutter. Boards to cut on. (5) Containers for weighing the cut cabbage. (6) A wooden head or round piece of hardwood board about 1 inch thick and just small enough to slip in and out of the keg easily. Allow for swelling. A plate of suitable size is even better than a board. (7) Clean stones or bricks to weight the cabbage down in the brine (not limestone). A 5-gallon keg of kraut requires approximately a 10-pound weight. Increase weight with size of container. (8) White muslin or several thicknesses of cheesecloth cut 6 inches larger than the crock or keg, to cover the cabbage after it is packed.

Procedure in making sauerkraut. Use only sound cabbage. Trim off any undesirable parts. Wash cabbage. Shred fine, retaining core if desired. Weigh shredded cabbage and weigh $2\frac{1}{2}$ to 3 per cent as much salt as cabbage. That is, use from $2\frac{1}{2}$ to 3 pounds of salt to 100 pounds of shredded cabbage. Two and a half per cent of salt is the same as 1 pound of salt to 40 pounds of cabbage or four ounces of salt, a scant half cup, to 10 pounds of cabbage. The smaller amount of salt may be used with very clean cabbage, very clean utensils, and the right temperature. The more salt, the less risk of spoilage. More than 3 per cent salt, however, will taste very salty.

Place a 3-inch layer of shredded cabbage in the container and pack down with the hands or with a tamper. Sprinkle with some of

* For other methods of preservation of vegetables by salting ask Extension Service office for Farmer's Bulletin 1932, "Preservation of Vegetables by Salting and Brining."
For salting meats and fish see Extension Bulletin 600, "Curing Meats and Fish."

the salt. Add more cabbage, pack in firmly, and add more salt. Continue placing alternate layers of cabbage and salt and pack down each layer firmly, until container is $\frac{3}{4}$ full. The weighed salt should be evenly distributed throughout the cabbage, but in case extra salt is left, sprinkle it on the top layer. Several layers of large outer cabbage leaves are desirable. This will later facilitate opening the container without mixing the scum with any of the kraut. Spread the cloth over the mixture, tucking it down at the sides. On the cloth place the board or plate and on the board place the stone. The weight should be heavy enough to cause a brine to come up to the cover in a day or two. Leave in a warm clean place, preferably at 65° to 75° F. until bubbling or fermentation stops. The time needed for fermentation varies from 2 to 4 weeks. If scum or mold appears, remove it at about 2-day intervals, or it may completely spoil the kraut. Lift cloth carefully so that as much skum as possible sticks to it. Skim top of brine. Do not disturb leaves. Wash and replace cloth, cover, and weight. After fermentation stops, seal the kraut in one of various ways. A common method used is to move the container to a cool place, remove the cloth and any scum or mold, adjust the amount of brine and weight so that the brine comes up to, but not over the cover, and pour very hot melted paraffin over the surface of the brine that is exposed. Do not move the container after pouring in the paraffin. After kraut is taken from the container, cover soon again with paraffin. If the kraut is to be kept a considerable length of time, scum and mold must be prevented from forming.

Small amounts of sauerkraut may be conveniently made by thoroughly mixing 4 ounces of salt to 10 pounds of finely shredded cabbage in a dishpan. This may be tightly packed in fruit jars. Try to pack tight enough to bring juice to the top or refill next day. Place lid but do not quite seal (loosen mason type jars about $\frac{1}{4}$ turn). As fermentation (bubbling) proceeds gas will escape. When fermentation ceases seal the jars tight.

To preserve other vegetables than cabbage by dry salting with fermentation, wash and trim them as for cooking and proceed by the same method described for sauerkraut.

B. DRY SALTING WITHOUT FERMENTATION

Snap beans, lima beans, peas, corn, dandelion greens, beet tops, spinach, chard, and kale are preserved by salting without fermentation. Use one-fifth as much salt as vegetables by weight, that is, 1 pound of salt to 5 pounds of vegetables. This proportion of salt largely prevents fermentation and growth of molds. Although 20 per cent salt is ordinarily sufficient, some may prefer to use 25 per cent as an added precaution.

Boil *corn* 10 minutes, then cut from the cob. For best results blanch *snap beans*, *lima beans* and *peas* in boiling water or in steam 5 minutes. Cool before salting.

Proceed by the method described under sauerkraut, except that layers of vegetables should be not more than 1 inch thick. If a brine does not form in 24 hours after application of the weight, add a saturated brine until it comes up to the cover. A brine of 1 pound of salt to 2 quarts of water may be used.

Using brined products. Soak food preserved in salt without fermentation several hours in cold water before cooking, changing the water several times. Use 1 gallon of water per quart of vegetables. Cook and season as in preparing fresh vegetables, except that salt is omitted.

PUBLICATIONS AVAILABLE ON SUBJECTS RELATED TO HOME FOOD PRESERVATION

Oregon State College Publications

- The Freezing Preservation of Fruits and Vegetables—Extension Bulletin 688
Bottling Fruit Juices—Mimeograph Circular HE 748
Curing Meats and Fish—Extension Bulletin 600
Fruit Jellies, Preserves, Jams, Marmalades, Conserves, and Butters—Mimeograph Circular HE 498
Home Fruit and Vegetable Dehydration—Station Circular 423
Homemade Pickles and Relishes—Mimeograph Circular HE 750
Preserving Eggs in Water-Glass Solution and Limewater—Mimeograph Circular HE 784
The Preservation of Seafoods—Station Circular 164
Tomato Recipes—Mimeograph Circular HE 208
Vegetable Storage—Extension Bulletin 601
Farm and Home Vegetable Garden—Extension Bulletin 614
Growing Fall and Early Winter Vegetables—Extension Bulletin 594
Vegetable Garden Insect-Pest Control—Extension Bulletin 551
Construction and Operation of a Home Electric Food Dehydrator—Station Circular 309
Homemade Evaporators—Mimeograph Circular HE 1754
Home Preservation of Eggs—Mimeograph Circular HE 1897

U. S. Department of Agriculture Publications

- Beef on the Farm, Slaughtering, Cutting, and Curing—Farmers' Bulletin 1415
Drying Food for Victory Meals—Farmers' Bulletin 1918
Home Canning of Fruits and Vegetables—AIS 64
Homemade Jellies, Jams and Preserves—Farmers' Bulletin 1800
Home Storage of Vegetables—Farmers' Bulletin 1939
Lamb and Mutton on the Farm—Farmers' Bulletin 1807
Making Butter on the Farm—Farmers' Bulletin 876
Making Fermented Pickles—Farmers' Bulletin 1438
Making Vinegar in the Home and on the Farm—Farmers' Bulletin 1424
Pickle and Relish Recipes—AWI 103
Pork on the Farm—Farmers' Bulletin 1186
Preservation of Vegetables by Salting and Brining—Farmers' Bulletin 1932
Home Canning of Meats—AWI 110

These publications and a list of other available bulletins on home economics subjects can be obtained free of charge while they last from your County Extension Agent or by writing the Home Economics Extension Service, Oregon State College, Corvallis, Oregon.

Cooperative Extension Work in Agriculture and Home Economics

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Oregon State College and United States Department of Agriculture, Cooperating

Printed and distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914