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FOOD PRESERVATION *By Freezing*



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Food Preservation By Freezing

MABEL DOREMUS AND MAY STANEK

QUICK FREEZING, when properly done, preserves foods so that the color, flavor, texture, and nutritional values of many fresh products are more nearly retained than by any other preserving method.

In preparing foods for freezing, cleanliness, attention to detail, and speed, particularly in handling vegetables and meats, cannot be overemphasized. Special care must be taken to obtain proper varieties of vegetables and fruits for freezing, to gather them at their prime, and to get them into the locker promptly.

TEMPERATURES FOR FREEZING AND STORAGE

RESULTS FROM RESEARCH carried on at various institutions show that the most satisfactory frozen foods are obtained when the products are frozen rapidly. With rapid freezing, the high quality of the fresh food is maintained and there is less tearing of the tissues as the ice crystals form and expand. A quick-freeze room or cabinet is desirable for storage lockers, and a temperature of -10° to -20° F. or



Meat, vegetables, and fruits maintain their quality when frozen quickly in a sharp-freeze room at temperatures of 10° to 20° below zero.

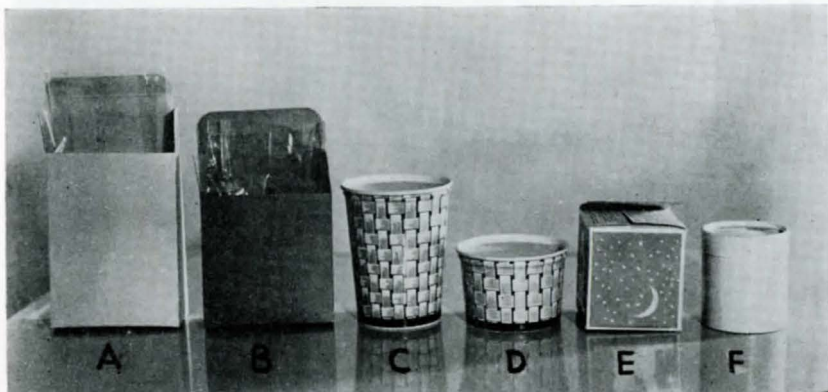
lower should be used for freezing. Average-size packages should remain in the quick-freeze for 14 to 48 hours, depending on the kind of quick-freeze, size of package, and the nature of the product. If a quick-freeze is not available, arrange to keep food items separated or spread out until frozen.

It is now recommended that the storage locker room or home freezer unit be maintained at 0° F. or lower and that temperature never be allowed to fluctuate more than 5° F. Flavor and quality are impaired if temperatures are allowed to fluctuate. When food is first frozen in a quick-freezing room or cabinet, solid wall lockers or non-ventilated lockers reduce air circulation and result in less shrinkage and dehydration during the storage period.

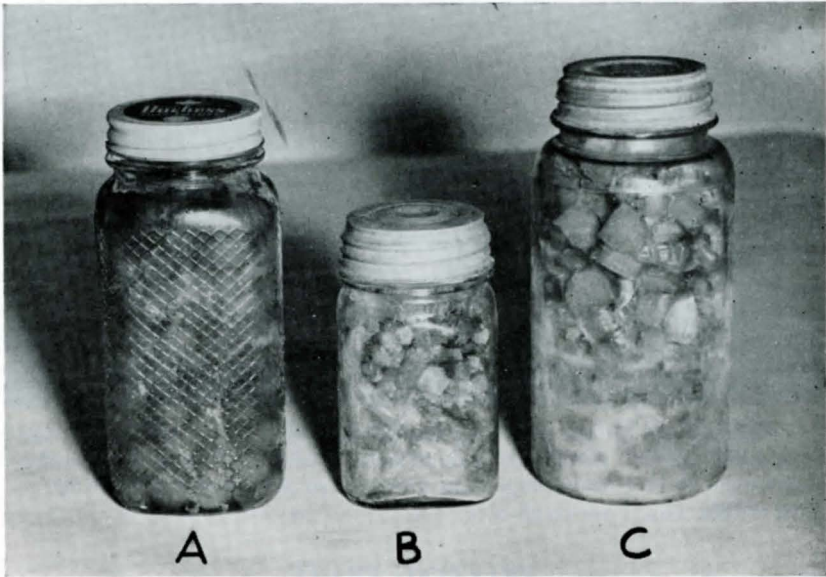
WRAPPING MATERIALS AND CONTAINERS

TO KEEP FROZEN FOOD similar in quality to fresh food, it is necessary to keep the moisture in and the air out. Wrapping materials and containers should be selected with these principles in mind. Moisture-vapor-proof paper is generally used for wrapping meat and poultry.

Containers should be of a size that best meets the needs of the family. Usually average-size containers (pints or quarts) are best for quick freezing. Square or rectangular containers save much space in the locker and home freezer.



Several cartons and containers are on the market, and new ones are being offered each season. A and B are serviceable cartons with cellophane bags inside which are sealed after filling. C and D are waxed fruit cups most commonly used for berries. E is a waxed square carton which can be sealed with a hot iron. F is a lightly waxed carton with vertical sides which can be used for fruit or vegetables. A, B, and E are preferred for vegetables; C, D, E, and F for fruits, and for vegetables that might leak some liquid while being prepared for freezing.



Glass jars make airtight containers but are easily broken and do not make economical use of locker space. A—cherries, B—asparagus, C—rhubarb.

The containers found most satisfactory for fruits and vegetables are heavily paraffined paper-board cartons. Paraffined folding cartons with waterproof cellophane or paraffined lining bags prove very satisfactory as containers for many frozen products. The liners are sealed with a hot iron.

Glass jars may be used. An airtight container is desirable and a glass jar sealed with a rubber fulfills that requirement. Precaution needs to be taken, however, not to fill the jars more than nine-tenths full to allow room for expansion of the product in freezing. Products need to be almost completely thawed before they can be removed from the jars. Glass jars must be piled and handled carefully in lockers and home freezers to prevent breakage. Some jar companies have on the market glass jars made especially for freezing. They have slightly tapered sides and no shoulders. Some have lids with a rubber compound sealing material.

Tin containers may be used if they are airtight. They may be sealed with a hand sealer or provided with suitable friction-top covers. Lacquered tins are necessary for most fruits and vegetables, particularly those fruits with high acid content, those which discolor badly, such as red fruits and beets, and vegetables packed in weak brine solutions. About one-half inch space should be allowed in tin and paper containers to provide for expansion in freezing.



Packages and cartons should be labeled with the name of the product and the date prepared. A crayon or a china marking pencil may be used for writing on waxed boxes. Meats wrapped in waxed paper may need a tag fastened to the string.

FREEZING FRUIT

WHEN CHOOSING varieties of fruits recommended for freezing, generally those kinds that cannot be stored successfully are frozen. For example, certain varieties of early apples with a comparatively short storage period could be frozen.

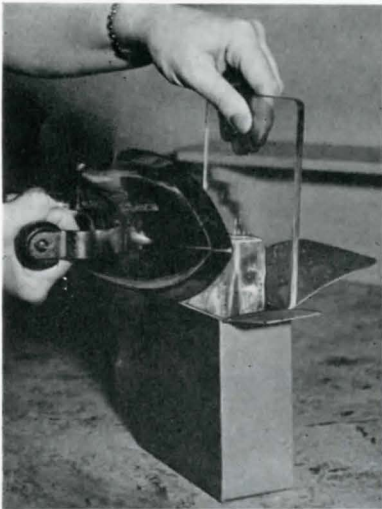
These varieties of fruits grown in Nebraska are recommended for freezing:

1. **Apples.**—Duchess, Wealthy, Grimes Golden, Yellow Transparent, Jonathan, Winesap.
2. **Apricots.**—Blenheim, Moorpark.
3. **Blackberries.**—Snyder, Eldorado.
4. **Boysenberries.**
5. **Cherries.**—Montmorency, English Morello, Early Richmond.
6. **Gooseberries.**—Carrie, Downing, Champion.
7. **Grapes.**—Concord, Worden, Niagara.
8. **Peaches.**—Elberta, Rochester, Champion, Hale Haven.
9. **Pears.**—Kieffer, Clapp's Favorite, Lincoln, Flemish Beauty.
10. **Plums.**—Redwing, Damson, Wauneta, Omaha, Superior.
11. **Raspberries.**—(Black) Cumberland.
12. **Raspberries.**—(Purple Cane) Cardinal, Sodus.
13. **Raspberries.**—(Red) Latham, Chief.
14. **Rhubarb.**—Ruby, McDonald, Linnaeus, Victoria.
15. **Strawberries.**—June bearing: Senator Dunlap, Blakemore, Premier. Everbearing: Gem, Wayzeta.

A high quality frozen fruit can be obtained only from a high quality fresh fruit. Select fully ripe, sound fruits. The use of unripe fruit results in an undesirable texture, flavor, aroma, and color. The fruit is likely to taste sour and somewhat bitter. Be sure to select ripe peaches and apricots since those frozen when too green become tough and have a bitter taste. Fruits for freezing are prepared in the same manner as for table use or canning. Strict cleanliness in handling will help reduce the number of bacteria and assure a frozen product of high quality. Fruits that break down in canning such as berries, could well be frozen. Freezing should supplement rather than replace all other methods of food preservation. If locker space is scarce other fruits could be canned.

Sirup pack. A sugar sirup helps preserve the color of light colored fruits. Large fruits such as peaches, apricots and plums may be packed in such a sirup. Strawberries and raspberries may also be frozen in sirup. Use the least possible amount of sirup to cover the fruit.

A 40 to 60 per cent sirup may be used. A 40 to 45 per cent sirup (medium) is best suited to sweet and mild-flavored fruits while a 50



When cartons and cellophane bags are used, fill the bag in the carton, then seal the top of the bag with a hot iron. In this illustration, a piece of windshield glass is being used to press against in sealing the bag. Several cartons can be sealed per minute in this manner, and without handling the cartons.



Heat sealing of cellophane liner bags may be done as shown in this illustration by tipping the container over onto a padded pan and placing a warm iron on the cellophane bag. Cartons must be handled but even pressure can be applied to obtain a perfect seal.

to 70 per cent sirup (heavy) may be used for sour, acid fruits. When making the sirup, stir until the sugar is dissolved. It is not necessary to heat or cook the sirup.

To keep light fruits from darkening, further helps are to place them in a citric acid dip using $\frac{1}{4}$ teaspoon citric acid to 1 quart of water, or add $\frac{1}{4}$ teaspoon ascorbic acid to 1 cup of sirup and pour over the fruit.

Sirup for Freezing Fruits

<i>Concentration</i>	<i>Proportion of Sugar</i>
20%	1 cup sugar to 4 cups water
25%	1 cup sugar to 3 cups water
30%	1 cup sugar to 2 cups water
40%	1 cup sugar to $1\frac{1}{2}$ cups water
50%	1 cup sugar to 1 cup water
60%	$1\frac{7}{8}$ cups sugar to 1 cup water
65%	$2\frac{1}{4}$ cups sugar to 1 cup water
70%	$2\frac{3}{4}$ cups sugar to 1 cup water

Dry-sugar pack. One method extensively used is to combine the whole or sliced fruit with dry sugar. The sugar draws out the fruit juice, forming a sirup without the addition of water. Cherries, strawberries, raspberries, and other small fruit may be packed this way. The proportion is usually one pound of sugar to three or four pounds of fruit. Distribute the sugar evenly throughout the product so that it dissolves quickly. This gives a less tender product than the sirup method but less watery. Cut strawberries one-quarter to one-half inch in thickness so that the juice is drawn from the berries quickly and the sugar and juice form a sirup at once.



When dry-sugar pack is used, sprinkle sugar over fruit, and mix gently.



These waxed cartons are filled to within about one-fourth inch of the top to allow head room.

When fruit is covered with a sugar sirup, or when dry sugar is put in to form a sirup from the juice of the fruit, less air comes in contact with the fruit. This is desirable because oxidation of fruits by air results in discoloration and unpleasant changes in flavor.

Preparation of Fruits for Freezing

<i>Fruit</i>	<i>Method of Preparation</i>	<i>Type of Pack</i>
Apples	(1) Peel, slice in 12ths, scald in boiling water 3 to 4 minutes; cool in air or cold water (2) Prepare as applesauce in the usual manner, sweetening to taste	Dry, no sugar or sirup; quick freeze Cool before packaging and quick freeze
Apricots	Sort, wash, halve and pit	Cover with 60 or 70% sirup * and quick freeze
Blackberries	Clean, wash and sort	Cover with 50 or 60% sirup * and quick freeze
Cherries (sour)	Wash, chill and pit	Cover with sugar—1 cup to 5 cups fruit; stir gently until sugar is partly dissolved in juice drawn from cherries; quick freeze
Cherries (sweet)	Stem, wash and pit	Cover with 40 or 50% sirup * and quick freeze
Gooseberries	Wash, stem and crush slightly	Cover with sugar—1 cup to 3 cups fruit; quick freeze
Grapes	Stem and wash	Cover with 40 or 50% sirup * and quick freeze
Peaches	Peel, pit and slice	Cover with 60 or 70% sirup * and quick freeze
Pears	Peel, core and quarter	Cover with 60 or 70% sirup * and quick freeze
Pineapples	Peel, remove core, slice or dice	Cover with 60 or 70% sirup * and quick freeze
Plums	Wash, pit and quarter	Cover with 60 or 70% sirup * and quick freeze
Raspberries	Clean and wash	Cover with sugar—1 cup to 6 cups fruit; stir gently until sugar is partly dissolved in juice drawn from berries; quick freeze
Rhubarb	Wash, trim and cut into 1-inch pieces; pack raw or if desired may scald 1½ minutes	Pack without sugar; quick freeze
Strawberries	Wash, hull, slice or crush	Cover with sugar—1 cup to 6 cups fruit; stir gently until sugar is partly dissolved in juice drawn from berries; if preferred, may cover with 50 or 65% sirup *; quick freeze

* See *Sirup for Freezing Fruits*, page 8.

Fruit purees. Fruit puree may be prepared from fruits with bright colors and pronounced flavors such as berries, cranberries, and grapes. These should be put through a sieve and sweetened (using 1 cup sugar to each 5 cups crushed fruit), and should then be frozen. This is one way to utilize less desirable fruit and also have the pureed fruits ready for use.

Fruit juices. Fruit and tomato juice may be frozen, but must not be allowed to stand before freezing. Contact with the air causes them to lose flavor and develop off-flavors. Fruits for juices include grapes, cherries, raspberries, grapefruit and oranges. Most fruit juices are frozen without sugar, but they may be sweetened if desired.

FREEZING VEGETABLES

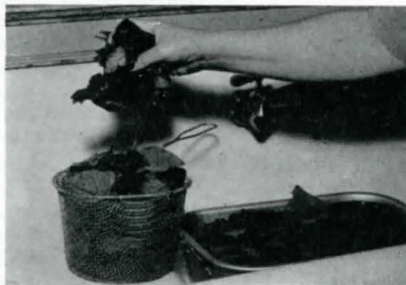
TO SAVE LOCKER SPACE it is well to freeze only those types of vegetables in which freshness is the principal factor of quality, those which lose flavor or color in canning, those which are not bulky, and those which do not keep well by other food storage methods.

Vegetables which are to be frozen should be harvested when in prime condition. The product should be graded for uniformity in maturity and size, thoroughly cleaned, and prepared as for cooking. The shorter the time between harvesting and the time the product is properly prepared and placed in the sharp freezer, the better the product.

Some vegetables which, when properly frozen and cooked, taste like fresh vegetables are: peas, young lima beans, asparagus, sweet corn off the cob, broccoli, spinach, and kale. Experiments have shown that certain varieties of vegetables are better adapted to freezing than others. Some varieties of vegetables grown in Nebraska found to be good for freezing are:

1. **Asparagus.**—Washington varieties.
2. **Beans.**—(Lima) Henderson Bush, Baby Potato, Peerless.
3. **Beans.**—(Snap) Stringless Greenpod, Tendergreen, Kentucky Wonder, Black Valentine, Round Pod, Kidney Wax.
4. **Beets.**—Detroit Red, Dark Red.
5. **Broccoli.**—Italian Green Sprouting.
6. **Carrots.**—Nantes Coreless, Improved Chantenay, Danvers Half Long.
7. **Peas.**—Little Marvel, Laxton Progress, Hundred-fold, Blue Bantam, edible podded sugar peas.
8. **Spinach.**—Bloomsdale Savoy, Bloomsdale Long Standing, Giant Nobel, New Zealand.
9. **Sweet Corn.**—Golden Bantam, Golden Cross Bantam, Tendergold, Narrow Grain Evergreen, Marcross, Country Gentleman.

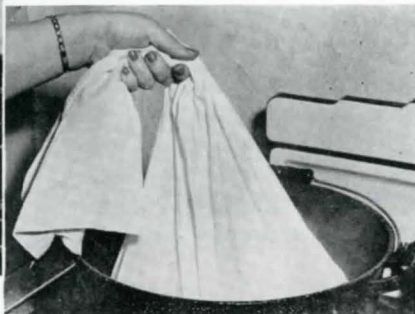
STEPS IN PREPARING VEGETABLES



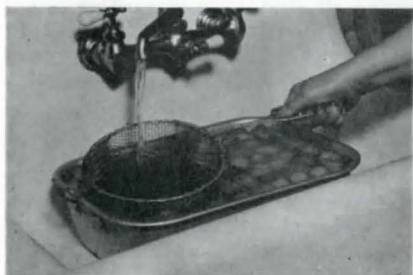
Wash vegetable thoroughly immediately after harvest. Place in wire basket ready for scalding.



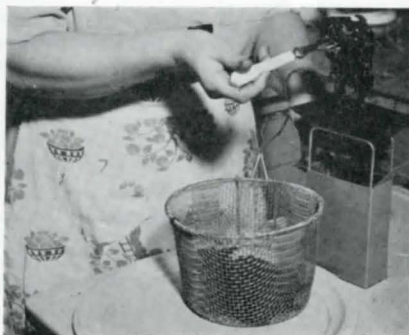
Peas or other similar vegetables may be scalded in this manner. Use a large, deep kettle and about four quarts of boiling water. Scald not over a pound of vegetables at a time, using the same boiling water again and again.



Sweet corn can be scalded in this manner. Use a large deep kettle about two-thirds full of boiling water. Dip from six to twelve ears at a time.



Immerse scalded vegetable in cold running water. Ice will help to cool the vegetable to at least 60°.



A plastic funnel and wire frame help to hold the cellophane bag and carton in shape for filling.

Preparation of Vegetables for Freezing

<i>Vegetable</i>	<i>Form in Which Frozen</i>	<i>Treatment Before Freezing</i>	<i>Care After Scalding</i>
Asparagus	Young, green	Wash, scald $3\frac{1}{2}$ minutes in boiling water	Cool in cold running water, pack in airtight containers; quick freeze
Beans: Snap	Small, fresh, tender	Clean, wash, cut into desired length, scald 2 minutes in boiling water	Cool in cold running water, pack in airtight containers; quick freeze; store at very low temperature
Beans: Lima	Small, fresh	Shell, wash, scald in boiling water 1 to 2 minutes, depending on size	Cool promptly; pack in airtight containers; quick freeze
Beets	Young, tender	Cut off tops; mature beets should be cooked, then peels rubbed off; slice or dice beets	If $1\frac{1}{2}$ -inch diameter, scald in boiling water $2\frac{1}{2}$ minutes; if over $1\frac{1}{2}$ inch diameter, cook until tender in boiling water; quick freeze.
Broccoli	Compact heads	Cut head into 1-inch thick pieces; wash, scald 3 to 5 minutes in boiling water or 5 minutes in steam	Cool in cold running water; pack in airtight containers; quick freeze
Carrots	Young, small	Top, scrape, then cut into $\frac{1}{4}$ -inch slices; scald 3 minutes in boiling water	Cool in cold running water; pack in airtight containers; quick freeze
Peas	Young, fresh	Wash, scald in boiling water 45 seconds if small, 1 minute if large	Cool in cold running water; pack in airtight containers; quick freeze
Spinach and other greens	Young, fresh	Wash in running water, eliminating all sand and earth. Discard thick stems, scald small amount at a time, for $2\frac{1}{2}$ minutes in boiling water	Cool immediately in cold running water; drain and pack in moisture-vapor-proof containers; quick freeze
Sweet corn, on the cob	Fresh, young, tender	Husk, sort and scald in boiling water $6\frac{1}{2}$ to $10\frac{1}{2}$ minutes depending upon the size of ears and maturity of kernels	Cool immediately in very cold running water; wrap individual ears in moisture-vapor-proof paper and quick freeze
Sweet corn, whole kernel	Fresh, young, tender	Scald ears 2 or 3 minutes in boiling water; cool; cut from cob	Pack dry in moisture-vapor-proof containers and quick freeze

Vegetables to be frozen must be scalded in boiling water or steam immediately after preparation in order to destroy enzymes which might result in undesirable flavor. Scald not over a pound of vegetable per gallon of boiling water. Never scald more than 1 pound of greens or 2 pounds of other vegetables at one time. A wire basket or a cheesecloth sack may be used for immersing the vegetables in the boiling water. The water should reach the boiling point again one-half minute after the vegetable has been immersed in it. Cool the vegetable quickly to at least 60° F. in cold running water. Ice may be used for chilling the water. Drain well and pack. Quick freeze at once.

Brine pack. Commercially packed vegetables are packed without liquid and this method is recommended for home use. A few people prefer to pack vegetables in a 2 per cent salt solution which later can serve as part of the cooking water. The brine protects against drying and delays total defrosting when the products are taken home. This brine solution is prepared by adding 1 teaspoon of salt to 1 cup of water, and should be cold when added to the product.

Vegetable purees. Cook the vegetable in boiling water or steam until it is done. Strain the vegetable and pack into container and quick freeze. Vegetable purees may be used in soups, for the baby's vegetables or in the diet of the sick. Those vegetables which make the best frozen pureed products are asparagus, peas, spinach, carrots, beets, parsnips, rutabagas, turnips, sweet potatoes, pumpkin and winter squash.

FREEZING MEAT

BEEF, LAMB, and pork can be stored in a freezer locker for some time. Healthy, well-conditioned animals furnish the best meat. Meat with a good covering of fat dries less while freezing and is more tender and juicy than meat which is all lean. Fresh pork is more perishable than beef or lamb and ordinarily should not be kept frozen more than six to eight months. Beef, lamb and lightly cured pork may be kept a year or more if properly prepared and stored in a good locker.

In handling meats, insure cleanliness by having clean hands, utensils, clothing and equipment. Well-finished beef and lamb may be aged to develop flavor and tenderness but recent experiments indicate that the longer they are aged the sooner they become rancid in the frozen food lockers. The temperature of the aging room should be around 36° F. After thoroughly chilling good quality meat for 10 to 14 days the meat may be cut and quick frozen. Pork is not aged but packaged and frozen as soon as thoroughly chilled (36 to 48 hours).

Wrapping meat. These directions are included for persons with home freezer units or those who wish to wrap part of their products before taking them to the locker plant. Most locker plants prefer to

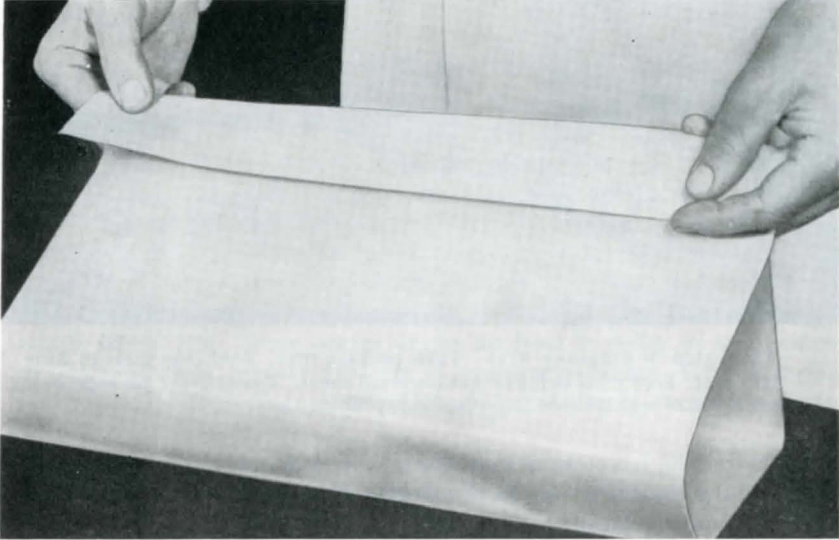
do all of their own meat wrapping. They like to offer the best of service and prefer to handle all meats on a uniform basis. Many times other services such as slaughtering, chilling and curing are available also. A brief description of wrapping methods is given here for the person who does some wrapping at home. He may wish to wrap some or all of his meat and poultry or he may own a home storage unit and needs to know good meat wrapping procedures.

To conserve locker space, trim the cuts to convenient shapes, removing as much of the bone as possible. Either the butcher's wrap or the drugstore wrap may be used. The size of the individual meat package will depend on the size of the family and the refrigeration facilities at home. When a number of cuts are placed in the same package, each cut should be separated from the others by a piece of waterproof paper. If this is done, then individual cuts may be separated without thawing. Ground meat may be packaged in waxed paper cartons. Unseasoned sausage will keep in the freezer locker a longer period of time than seasoned sausage, but it is not as satisfactory to mix the seasoning into the ground pork after it is frozen and then thawed. With good refrigeration and proper packaging seasoned sausage may be kept in the locker, without the development of undesirable flavors, for a period of one to three months.

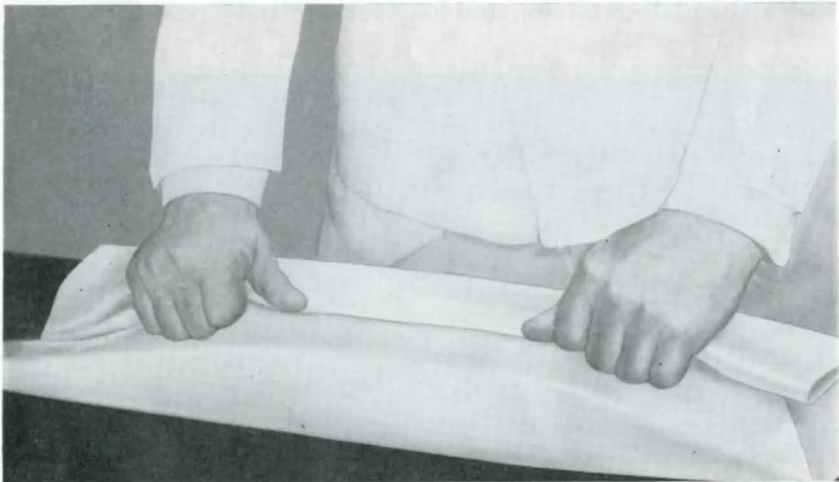
In order that meat be palatable after being kept several months in a frozen food locker, proper packaging and wrapping materials are extremely important. Meat should be packaged in a moisture-vapor-proof paper in a manner to exclude air as completely as possible. Tight packaging will prevent air pockets in the package. They are just as damaging to meat quality as is air in direct contact with the meat.

There are many kinds of moisture-vapor-proof papers on the market. In addition to the waxed and parchment papers, there are moistureproof cellophane, and aluminum foil that give the needed protection to frozen meats. The package should be tied or sealed with locker tape. Do not use plain butcher paper, ordinary cellophane, or household waxed paper to wrap meats for freezing as they are not sufficiently moistureproof. A double wrap is sometimes used as added protection against dehydration. Sometimes wrapped meats are placed in an elastic stockinette. The advantages of using the stockinette are to protect the wrapping from being torn or punctured during handling, to hold the wrapper in close contact with the meat, to do away with need for tying or taping the package, and to make a neat-appearing package. After the package is wrapped, it is tied carefully or sealed with special tape, and contents of the package and the date indicated. The wrapped meat is then spread out in the quick-freeze for freezing. It is important for the meat to be frozen before it is packed in the lockers. If piled in the locker or home freezer unit without quick freezing, freezing will be delayed and there is more danger of spoilage

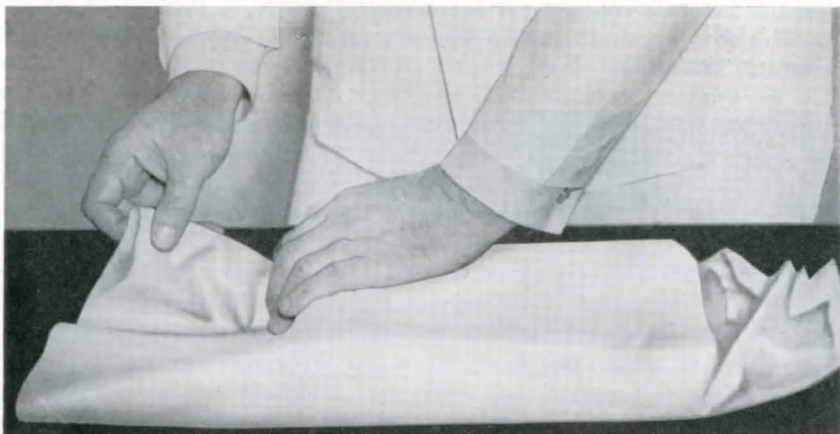
and off flavors. When meat is frozen too slowly, it loses much of its juice in thawing and cooking and as a result the product is dry when served at the table.



This is the first step in the drugstore wrap. Take hold of two ends of the paper and bring together at top over meat. Keep the ends as even as possible.

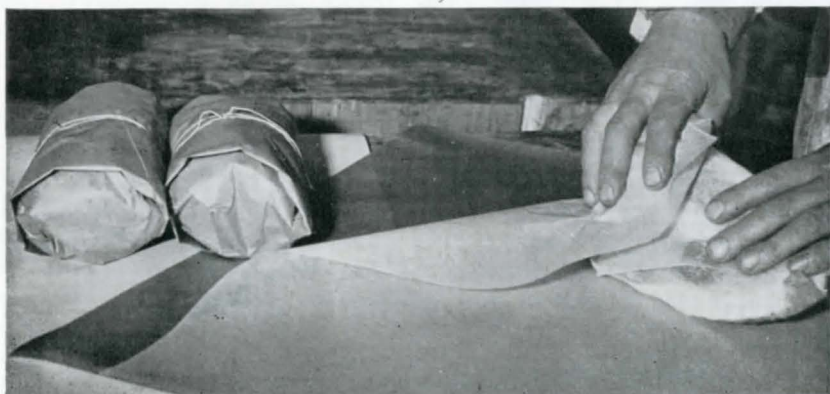


Second step in drugstore wrap. Fold paper over on itself about an inch. Fold again, as many times as it takes to stretch tight and flat against meat.



Third step in drugstore wrap. Turn package over. Fold over ends to form airtight seal. Fold ends twice or more toward meat. Turning the package over makes a better seal because it pulls the flap down tight.

Dip-coating is a new method for covering frozen foods which avoids many of the disadvantages of the wrappers in use today. The material used for coating must be odorless, chemically stable, non-toxic, insoluble in water, firm but flexible at low temperatures, and easy to apply and remove. One such material, now in the experimental stage, is plasticized or microcrystallin paraffin. The film coating reduces oxidation and "freezer burn" or drying out. "Freezer burn" causes meat to turn a grayish-brown color, and lose moisture and flavor.



This is the butcher's wrap. Note how the meat is being wrapped tightly with the inner waxed sheet of a special double freezer locker paper. The outer brown sheet is then wrapped around the package and tied.

Cured and smoked meat can be frozen. If meats have been properly cured, they will keep well under ordinary storage, but freezing helps to keep off the mold. It is advisable to cut ham into roasts or steaks unless an entire ham is to be roasted. Be sure to wrap smoked meats well.

FREEZING POULTRY AND GAME BIRDS

TO PREPARE POULTRY for freezing, thoroughly clean and prepare the bird as for table use. All poultry should be drawn as soon after killing as possible as this prevents the development of visceral taints. Dry picking will probably give the most satisfactory product. This method is too slow for commercial purposes but for a few birds is satisfactory. After dressing and removing the pin feathers, wash the bird carefully in cold water and cool thoroughly. A water spray will result in the least amount of contamination. Poultry may be stored either whole or cut up. Some prefer to cut up fowl in order to wrap pieces of one kind (legs, breasts, giblets), in separate packages. Giblets should be wrapped separately in moisture-vapor-proof paper, even when frozen with the whole bird.

Poultry may be glazed to prevent drying out. This service is offered at some locker plants and can be done satisfactorily only at the plant. The poultry is frozen, then dipped quickly into cold water. The zero temperature of the fowl causes a thin coating of ice to form over it immediately, sealing and protecting it. The glazed poultry is generally wrapped to prevent the glaze from being chipped off in handling. There is usually an extra charge for this glazing service. Since ice evaporates, the poultry will need to be re-dipped from time to time.

Chicken may be wrapped in the same kind of moisture-vapor-proof paper used for meats, or in cellophane moistureproof bags. The poultry may be sealed in the bag by pressing the folded edges with a hot iron. Sometimes broilers and frying chickens are wrapped and frozen in large, friction-top tin cans, cartons or cellophane bags.

Game birds should be dry picked promptly after killing, cleaned, washed and handled for freezing like other poultry.

FREEZING FISH

ALL FISH TO BE FROZEN should be placed on ice or in a refrigerator as soon as possible after catching and never be allowed to become warm. Before freezing, they should be properly cleaned and ready for cooking. If clean fish are immersed in 10 per cent salt solution (3 teaspoons salt to 1 cup water) for 20 to 30 seconds, the leakage or "weep" is reduced when the fish are thawed for cooking. They are then frozen as described for meat. Fish may be glazed after freezing to prevent drying out. (See directions for glazing poultry.)

FREEZING EGGS

ONLY LIQUID EGGS may be frozen. Freeze them in the form of whole eggs, whites alone, or yolks alone. When freezing whole eggs, break fresh clean eggs into a clean bowl. Beat the eggs so as to blend the yolks and whites. If desired, a tablespoon of sirup or honey may be added to each 2 cups of liquid eggs, to prevent gumminess when the eggs are thawed.

Separate whites from yolks when breaking if desired. Beat yolks slightly and add 1 tablespoon of sirup or honey to each 2 cups of liquid yolks. Package whites with nothing added and no mixing.

Put eggs into moisture-vapor-proof containers, quick freeze promptly and store at 0° F. Use 1 tablespoon egg yolk as an equivalent for 1 egg yolk asked for in a recipe. Use 1½ tablespoons whites for the white from one egg.

FREEZING COOKED FOODS

THE RESOURCEFUL homemaker will find that she can use her locker, and especially the home freezer unit, to advantage for storing many cooked foods which are sometimes prepared in larger quantities than needed for a single meal. The surplus may be placed in suitable containers and stored in the freezer locker if space permits. Such foods might include baked beans, chili, stew, creamed chicken, chicken a la king, cooked chicken for salad, part of a large roast or turkey, concentrated soup stock, steamed puddings, brown bread, and others too numerous to mention. These may be packaged in a manner similar to fruits and vegetables.

Freezing offers a desirable method for preserving and storing grated cheese and shelled nuts. These should be placed in tightly closed containers the same as vegetables and fruits. The home freezer units are proving to be of value in this short-time storage of prepared or cooked foods.

PREPARING FROZEN FOODS FOR THE TABLE

REFRIGERATION is desirable for frozen foods when they are removed from the locker. They may be kept for several days in the freezing compartment of a mechanical refrigerator. They will defrost slowly in an ice refrigerator but should not be left for longer than 12 hours after they are completely thawed. If it is desired to keep them longer, cook and then reheat just before serving.

Cooking frozen vegetables. Frozen vegetables need not be thawed before cooking. If they are partially defrosted, however, the large frozen pieces may be broken up easily when the vegetables are put on to cook. The cooking process is similar to the method used for fresh vegetables. Use a covered utensil with a small amount of water and

bring to a boil as rapidly as possible and begin to count the time when the water boils again. Cook for approximately one-half to two-thirds of the time required for cooking fresh vegetables. Less time is required because the frozen vegetables have been partially cooked in the scalding process. Leave the cover on until the vegetables begin to boil, then raise the lid for venting, replace the lid, lower the heat, and cook until the vegetable is done. Do not overcook.

Corn-on-the-cob is an exception to the rule that vegetables do not require thawing. If it is not thawed before cooking, the kernels will be overcooked and soggy before the center of the cob is hot. Be sure to use corn soon after it has been defrosted as it spoils more readily than the fresh product.

Serving frozen fruit. Frozen fruits are similar to fresh, unfrozen fruits that have stood in sugar. When served like fresh fruit, they are most palatable if served while still containing a few ice crystals. Experimenting to determine the time required to defrost the fruit to just the correct point is well worth the effort. Frozen fruits that have been thawed should be used very soon as they spoil more readily than fresh fruits.

Cooking frozen meats. Frozen meat may be cooked with or without thawing. There is no difference in the flavor. There is less leakage of meat juices after thawing if this thawing is done in the refrigerator for a day or two. Do not thaw in water as this draws out the meat juices. Cook as soon as possible after thawing. Frozen meat, after thawing, spoils more rapidly than fresh meat which has not been frozen.

If meat is not thawed, extra time will be needed for cooking. Experiments have shown that the shape of a roast influences the cooking time. A meat thermometer is useful for accuracy in roasting. To use it, make a hole in the meat with a skewer. Insert the thermometer in the largest or thickest part of the meat to the center. The cooking times for thawed and unthawed beef roasts are shown below.

Cooking Times for Thawed and Unthawed Beef Roasts
(Approximate minutes per pound)

<i>Degree of Doneness</i>	<i>Standing Rib</i>		<i>Rolled Rib</i>	
	<i>Thawed</i>	<i>Frozen</i>	<i>Thawed</i>	<i>Frozen</i>
Rare	18	43	28	53
Medium	22	47	32	57
Well done	30	55	40	65

Ordinarily, frozen steaks and chops are cooked approximately twice as long as fresh, unfrozen ones. The same methods are used for both thawed and unthawed steaks and chops but the broiling times must be longer for the unthawed. See table below.

Broiling Times for Thawed and Unthawed Steaks
(Approximate minutes per pound for rare to medium done)

<i>Size</i>	<i>Thawed</i>	<i>Frozen</i>
1 inch thick	8-10	21-33
1½ inches thick	10-15	23-38
2 inches thick	20-30	33-43

VITAMIN VALUES OF FROZEN FOODS

RECENT STUDIES on vitamin values of frozen food products indicate that frozen fruits lose little of their Vitamin B (riboflavin, niacin), and Vitamin C content during freezing or freezer storage if kept at very low temperatures. Frozen fruits, eaten as soon as taken from storage, contain more vitamins than canned fruits. Frozen vegetables stored at very low temperatures retain Vitamin A and the B vitamins. The Vitamin C value of frozen vegetables is conserved by freezing but may be decreased between harvesting and freezing and during scalding and cooling in preparation for freezing if these processes are not carefully safeguarded. When frozen vegetables are cooked, Vitamin C values may be conserved if a small amount of water is used and if the vegetables are not overcooked. Additional references:

A I S-48—Home Freezing of Fruits and Vegetables.

A W I-75—Freezing Meat and Poultry Products for Home Use.

E. C. 9967—Freezing Eggs.

E. C. 11-316—How to Choose and Use Your Home Freezer.