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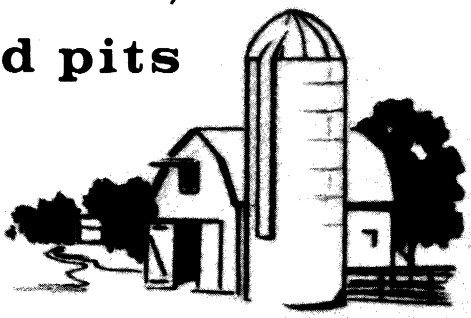
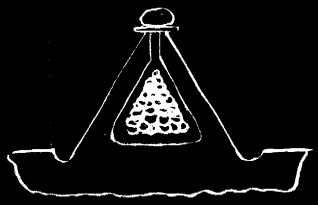
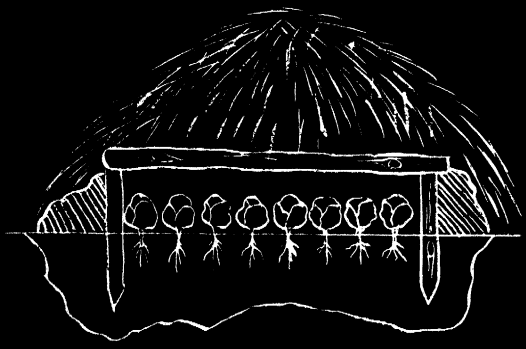
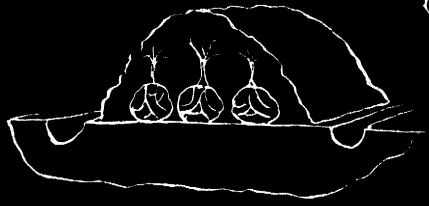
# STORING VEGETABLES AND FRUITS

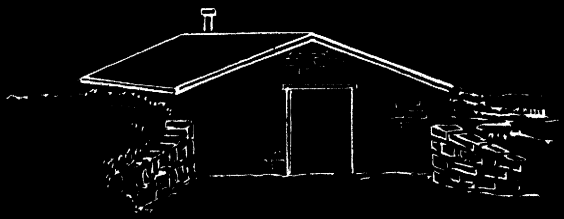
## in basements, cellars, outbuildings, and pits











HOME AND GARDEN BULLETIN NO. 119
U. S. DEPARTMENT OF AGRICULTURE

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# STORING VEGETABLES AND FRUITS in basements, cellars, outbuildings, and pits

You can store vegetables and fruits without refrigeration in basements, cellars, outbuildings, and pits, but you need cool outdoor air to cool the stored products.

## STORAGE FACILITIES

The kind of storage facility that you will need depends largely on the climate in your area. Storage facilities described in this publication are not practical unless you live in an area where outdoor temperatures during winter average 30° F. or lower.

### House Basement

A well-ventilated basement under a house with central heating may be used for ripening tomatoes and for short-term storage of potatoes, sweetpotatoes, and onions.

But to store vegetables and fruits over winter (long-term storage) in a basement that has a furnace, you will need to partition off a room and insulate it.

Build the room on the north or east side of the basement, if practicable, and do not have heating ducts or pipes running through it.

You need at least one window for cooling and ventilating the room. Two or more windows are desirable, particularly if the room is divided for separate storage of fruits and vegetables. Shade the windows in a way that will prevent light from entering the room.

Equip the room with shelves and removable slatted flooring. These keep vegetable and fruit containers off the floor and help circulation of air. The flooring also lets you use water or wet materials (such as dampened sawdust) on the floor to raise the humidity in the room.

Store vegetables and fruits in wood crates or boxes rather than in bins.

### Cellar Under House Without Central Heat

Cellars under houses without central heat have long been used successfully for winter storage of fruits and vegetables in colder parts of the United States.

These cellars usually have an outside entrance and a dirt floor. The door is a means of ventilating the cellar and regulating the temperature. Some cellars have no windows. If there is a window, it aids in ventilating and in temperature control.

You need at least one window, if the cellar has separate compartments for vegetables and fruits. Shade the windows in a way that will prevent light from entering the cellar. Insulate the ceiling so cold air will not chill the house.

## Outdoor Storage Cellars

Outdoor storage cellars can be constructed partly or entirely below ground. Cellars constructed below ground are better because they maintain a desirable temperature longer and more uniformly than cellars that are above ground.

Outdoor storage cellars may be attached to your house or located in your yard or under an outbuilding. They should be convenient to your kitchen.

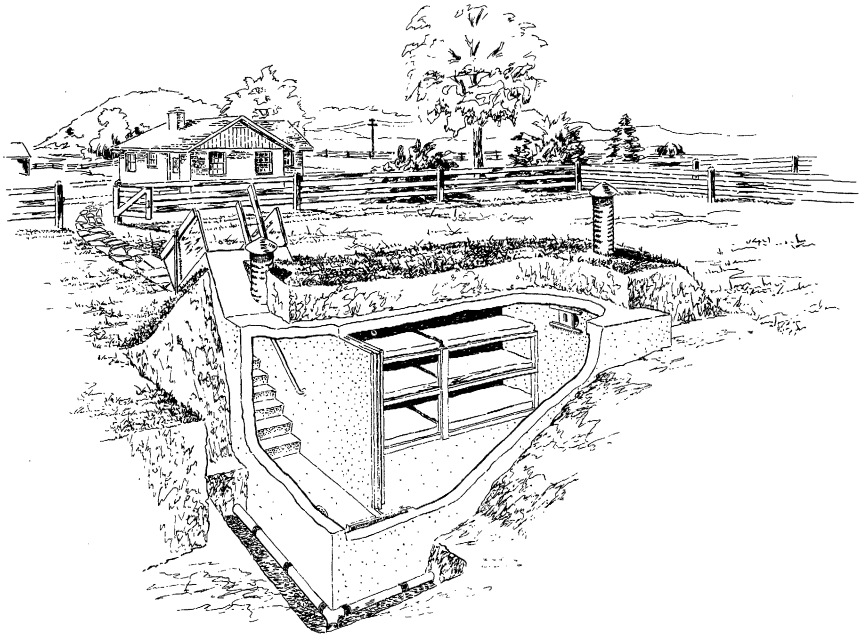
### *Underground Cellars*

The walls and roof of an underground cellar must be strong to support the weight of earth over the roof. Stone and masonry block in combination with concrete can be used, but a cellar made of reinforced concrete is better.

Figure 1 shows an underground cellar. The whole structure, except the door, is covered with soil. Wire screen over the outside ends of air intakes and ventilators keeps out birds and small animals.

This structure can also serve as a storm cellar or a protective shelter against radioactive fallout. (For further information, see your local civil defense organization.)

The cellar plan shown in figure 1 is identified as "Plan 5948."



Plan 5948

FIGURE 1.—Underground cellar that can also serve as a storm and fallout shelter.

24532

FIGURE 2.—Soil is banked around three walls; the exposed wall has an insulated double door.

Working drawings of this plan may be obtained through your county agricultural agent or from your State Extension Service at your State agricultural college. Give the *plan number* when you order. There is usually a small charge.

If working drawings of this plan are not available in your State, write to the Agricultural Engineering Research Division, Agricultural Research Service, U.S. Department of Agriculture, Plant Industry Station, Beltsville, Md. 20705. Include your ZIP Code in your return address. The U.S. Department of Agriculture does not distribute drawings, but will direct you to a State that does distribute them.

### *Partly Underground Cellars*

One type of cellar that can be used in colder parts of the country has walls of masonry that are partly under ground. Soil is banked around three walls, and one wall is left exposed for an insulated double door (fig. 2). If you have more than one storage compartment, an air inlet and a ventilator are needed for each one. Ventilators are indicated in figure 1.

## Outbuildings

Storing vegetables and fruits in aboveground storage buildings is practical only where the climate is consistently cold, but only if the average temperature is not below freezing. Even in these climates temperatures may drop to zero or

below, and supplemental heat may be needed on very cold nights. Thermostatically controlled heat may be used if electricity is available. Only a small amount of heat is necessary to prevent subfreezing temperature in a building. Storage temperature should be watched closely when low temperatures are predicted.

Aboveground storage buildings can be built of masonry or lumber, but they must be well insulated. Hollow-block walls, regardless of thickness, have little insulating value. Put vermiculite, or some other dry granular material, in the channels of hollow blocks as each layer of block is laid. If you use cinder blocks, scrub them on both sides with cement grout to make them less porous. Then paint them on the inside with aluminum paint; the paint serves as a moisture barrier. Lay tar paper between the ceiling and joists as a moisture barrier, and spread at least 12 inches of dry sawdust or other granular material in the attic above the ceiling.

A frame building can be built of 2- by 4-inch studding and rafters. Make walls tight by sheathing the inside and outside of the frame with matched lumber. Insulate the space between the walls with loose fill or mineral wool blanket. Put laminated kraft paper (with asphalt between layers), aluminum foil, or polyethylene between the insulation and inside walls as a moisture barrier. Put building paper over the outside sheathing before you lay shingles or siding to make the building tight. Paint the inside of the building with aluminum paint or whitewash.

To ventilate aboveground storage buildings, you need intake and exhaust vents.

## Pits

Cone-shaped outdoor pits (fig. 3) are often used for storing potatoes, carrots, beets, turnips, salsify, parsnips, and cabbage. They are sometimes used for storing winter apples and pears. The pit may be built on the ground, or in a hole 6 to 8 inches deep in a well-drained location. Build the pit as follows:

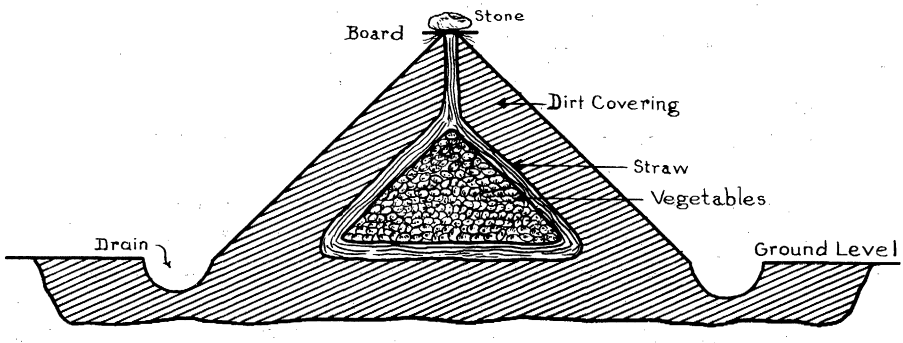



FIGURE 3.—Cone-shaped pit showing details of construction.

- Spread a layer of straw, leaves, or other bedding material on the ground.
- Stack the vegetables or fruits on the bedding in a cone-shaped pile. Do not store vegetables and fruits in the same pit.
- Cover the vegetables or fruits with more bedding.
- Cover the entire pile with 3 or 4 inches of soil.
- Firm the soil with the back of a shovel to make the pit waterproof.
- Dig a shallow drainage ditch around the pit.

Small pits containing only a few bushels of vegetables or fruits will get sufficient ventilation if you let the bedding material over the vegetables extend through the soil at the top of the pile (fig. 3). Cover the top of the pile with a board or piece of sheet metal to protect the stored products from rain; a stone will hold the cover in place.

To ventilate large pits, place two or three boards or stakes up through the center of the pile of vegetables or fruits to form a flue. Cap the flue with two pieces of board nailed together at right angles.

It is difficult to remove vegetables and fruits from cone-shaped pits in cold weather. And once a pit is opened its entire contents should be removed. For these reasons it is better to construct several small pits rather than one large one. Put a small quantity of different vegetables in each pit. This makes it necessary to open only one pit to get a variety of vegetables. When several vegetables are stored in the same pit, separate them with straw or leaves. Do not store apples and pears in vegetable pits.

46276

FIGURE 4.—A straw- and soil-covered barrel is adequate for keeping a small quantity of vegetables or fruits.

Another type of pit is made simply of a barrel covered with several layers of straw and earth (fig. 4).

Pits should be made in a different place every year. Leftovers in used pits usually are contaminated.

## KEEPING THE STORAGE SPACE CLEAN

Keep storage facilities for vegetables and fruits clean. Get rid of vegetables and fruits that show signs of decay. At least once a year, remove all containers from your storeroom. Then clean them and air them in the sun. Wash and whitewash the walls and ceiling of your storeroom before you put the containers back into storage.

## REGULATING THE TEMPERATURE

You will need at least two reliable thermometers (preferably of a kind that records minimum and maximum temperatures) to carefully regulate storage temperature. Place one thermometer in the coldest location of the basement, cellar, or outbuilding, and place the other thermometer outdoors.

Regulate storage temperature by opening and closing doors, windows, or other openings used as ventilators.

Outdoor temperatures well below 32° F. are necessary to cool storage air to 32° and to maintain that temperature. Once cooled to 32° the temperature will rise again if ventilators are closed, even though outdoor temperature is about 25°. Close ventilators tightly whenever the outdoor temperature is higher than the storage temperature. Watch indoor and outdoor temperatures closely. In most regions, daily adjustment of ventilators usually is necessary to maintain desired storage temperatures.

The danger of overventilating during subfreezing weather is that stored products will freeze if you are not careful. For example, in an insulated storage cellar partly above ground at Beltsville, Md., it was found that full ventilation both day and night was necessary to maintain a temperature of 32° F. if outdoor temperatures ranged between 18° and 30° during the day and dipped to 10° at night. If minimum temperature at night, under conditions of normal air movement, was 8° for 5 or 6 hours, the storage temperature dropped to 30°. During a night of high wind, however, a minimum of 12° cooled the cellar to 30°.

Temperature requirements of stored crops and points at which they freeze are given in table 1.

## MAINTAINING PROPER MOISTURE

Without proper moisture, stored vegetables and fruits shrivel, lose quality, and eventually become unfit to eat. Humidity requirements for vegetables and fruits are discussed on pages 8 to 17 and are summarized in table 1.

Two ways of maintaining proper humidity are (1) the use of water to raise the humidity of the storage air, and (2) the use of ventilated polyethylene bags and box liners.

Moisture can be added to storage air by sprinkling the floor frequently, by placing large pans of water under fresh-air intake vents, by covering the floor with wet materials such as straw or odorless sawdust, or by a combination of these. However, these methods will not prevent shriveling of root crops.

The easiest and most effective way to control moisture loss in

TABLE 1.—*Freezing points, recommended storage conditions, and length of storage period of vegetables and fruits.*

| Commodity | Freezing point | Place to store | Storage conditions | | Length of storage period |
|---|---|---|---|---|---|
| | | | Temperature | Humidity | |
| | ° *F.* | | ° *F.* | | |
| Vegetables: | | | | | |
| Dry beans and peas | | Any cool, dry place | 32° to 40° | Dry | As long as desired. |
| Late cabbage | 30.4 | Pit, trench, or outdoor cellar | Near 32° as possible | Moderately moist. | Through late fall and winter. |
| Cauliflower | 30.3 | Storage cellar | do | do | 6 to 8 weeks. |
| Late celery | 31.6 | Pit or trench; roots in soil in storage cellar. | do | do | Through late fall and winter. |
| Endive | 31.9 | Roots in soil in storage cellar | do | do | 2 to 3 months. |
| Onions | 30.6 | Any cool, dry place | do | Dry | Through fall and winter. |
| Parsnips | 30.4 | Where they grew, or in storage cellar. | do | Moist | Do. |
| Peppers | 30.7 | Unheated basement or room | 45° to 50° | Moderately moist. | 2 to 3 weeks. |
| Potatoes | 30.9 | Pit or in storage cellar | 35° to 40° | do | Through fall and winter. |
| Pumpkins and squashes | 30.5 | Home cellar or basement | 55° | Moderately dry. | Do. |
| Root crops (miscellaneous). | | Pit or in storage cellar | Near 32° as possible | Moist | Do. |
| Sweetpotatoes | 29.7 | Home cellar or basement | 55° to 60° | Moderately dry. | Do. |
| Tomatoes (mature green). | 31.0 | do | 55° to 70° | do | 4 to 6 weeks. |
| Fruits: | | | | | |
| Apples | 29.0 | Fruit storage cellar | Near 32° as possible | Moderately moist. | Through fall and winter. |
| Grapefruit | 29.8 | do | do | do | 4 to 6 weeks. |
| Grapes | 28.1 | do | do | do | 1 to 2 months. |
| Oranges | 30.5 | do | do | do | 4 to 6 weeks. |
| Pears | 29.2 | do | do | do | See text. |

root crops and in certain other crops is to put them in polyethylene bags or box liners. Cut a few ¼- to ⅜-inch holes in the sides of the bags or liners to permit ventilation. Tie the bags and fold over the tops of box liners, but do not seal them.

## HANDLING VEGETABLES AND FRUITS

Vegetables and fruits that are to be stored should be handled carefully to prevent damage. Give special attention to containers that you use for harvesting and storing. Use containers that have smooth inner surfaces. Protruding wire staples in baskets and hampers are particularly damaging.

Lightweight tub buckets and plastic-coated stave baskets (egg baskets) are good containers for harvesting. If the soil is sandy, rinse the containers frequently to reduce skin breaks.

Standard apple boxes and lug boxes used for shipping tomatoes, grapes, and nectarines are good storage containers. Slatted crates can be made easily from melon crates.

Remove all crushed, cut, or decaying vegetables and fruits from those that are to be stored. If damaged or infected garden products are placed in storage, serious losses from decay are likely to occur.

See that vegetables and fruits have as little field heat as possible when you put them in storage. Harvest in early morning, or let the crops cool outdoors overnight before storing them.

Waxing vegetables for home storage is not recommended, although wax has been used for several years on certain fresh vegetables and fruits to improve their sales appearance and to reduce moisture loss.

## STORING VEGETABLES

More kinds of vegetables than fruits can be stored at home. Storage requirements of vegetables vary greatly, but certain ones can be stored together (see table 1).

To store vegetables successfully you must provide each vegetable with the temperature, humidity, and ventilation needed to control moisture loss, maintain flavor, and hold decay to a minimum.

Conditions under which vegetables keep best are discussed in this section.

### Dry Beans and Peas

All kinds of dry beans and peas, including lima beans and soybeans, may be kept for home use. You can dry beans and peas in two ways:

1. Pick the pods as soon as they are mature and spread them in a warm, dry place until they are thoroughly dry; or —

2. Pull and dry the bean plants like hay after most of the pods are ripe.

After drying the beans, shell them and give them one of the following treatments to protect them from destruction by moths and weevils:

1. Refrigerate them at 0° F. or below for 3 or 4 days.

2. Heat them in an oven at 180° F. for 15 minutes. As an added precaution, leave the beans in the oven for an hour after you turn off the heat.

3. Fumigate them with carbon tetrachloride in plastic bags, metal drums, or glass jars. Use 2 ounces of carbon tetrachloride for each 100 pounds of beans, or one-eighth teaspoon per pound. Sprinkle the carbon tetrachloride over a cloth and place the cloth in the container of beans; close the container tightly. After 48 hours, remove the beans and air them. Then put them in tight containers (plastic bags, glass jars, or cans) to prevent reinfestation by insects. Store the containers in a dry place.

## Late Cabbage

Cabbage may be stored in outdoor storage cellars (p. 2), in cone-shaped pits (p. 4), or in long pits (fig. 5). The advantage of long pits over cone-shaped pits is that you can remove a few heads of cabbage from a long pit without disturbing the rest of the pit.

To store cabbages in a long pit, pull the plants out by the roots, place them head down in the pit, and cover them with soil.

You can also store cabbage in a shallow trench that is framed with stakes or poles and covered with straw (fig. 6). To store cabbage this way, pull the plants out by the roots and set the plants side by side with their roots in the trench. After you put the plants

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**CAUTION**

Fumigate outdoors or in a well-ventilated room. Do not inhale fumigant vapors. Avoid spilling fumigant on your skin, and keep it out of your eyes, nose, and mouth. If you spill any on your skin, wash it off immediately with soap and water. If you spill it on your clothing, launder the clothing before wearing it again.

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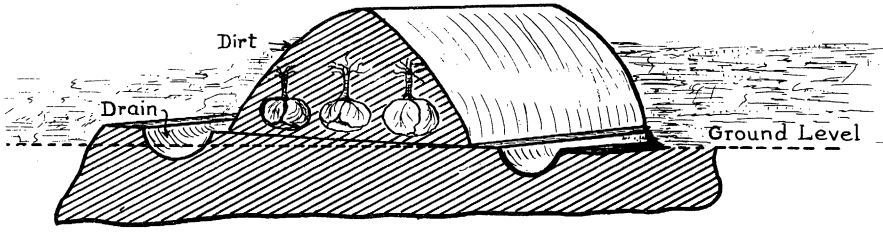
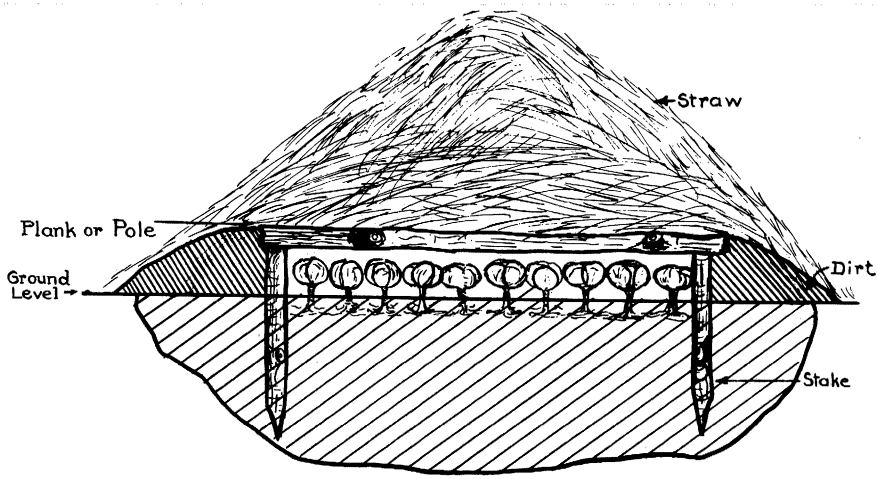



Hort. 50368

FIGURE 5.—Cabbages are placed head down in a long pit.




Hort. 50369

FIGURE 6.—Cabbages are placed upright in a trench that is framed with stakes and covered with straw.

in the trench, pack soil around the roots. Then build a frame about 2 feet high around the trench. The frame may be made of boards or poles or of stakes driven into the ground. Next, bank soil around the frame. Finally, place poles across the top of the frame to hold a covering of straw, hay, or corn fodder.

Heads of cabbage may be stored on shelves in an outdoor storage cellar. Do not keep them in your basement, because cabbage odor is likely to spread through the house.

## Late Celery

Celery plants of late-maturing varieties may be stored for 1 or 2 months in the garden. To store celery this way, bank a few inches of soil around the base of the plants at the end of the growing season; build the bank up to the top of the plants before severe freezing occurs. As the weather becomes colder, cover the banking with straw or corn fodder held in place with boards.

Another way to store celery is to dig a trench 10 to 12 inches wide, about 24 inches deep, and any desired length (fig. 7).

Dig the plants when they are fully grown. Take a clump of soil with the roots. Then pack the plants in the trench. Water the plants as you put them in the trench, and leave the trench open long enough for plant tops to dry off. Unless the soil is very dry at the time of storing or extended warm weather follows it, you do not have to water again.

Make a sloping roof for the trench by setting a 12-inch board on edge beside the trench; bank soil against the board. Then put boards, poles, or cornstalks (from which the tops have been removed) across the trench with one end resting on the upright board and the other end on the ground.

Spread a light covering of straw or other material that will pack closely over the roof. As the weather becomes colder, add more covering. Celery stored this way will keep until late winter.

You can also store celery in a hotbed (fig. 8). First remove surplus soil from the hotbed and substitute a covering of boards for the sash. Then pack the celery in the hotbed in the same way that is described for storing celery in a trench.

Celery may be stored on the floor of a basement storage room or in an outdoor storage cellar. For this kind of storage, take celery plants from the garden just before freezing occurs. Dig up the roots in a clump of soil. Then set the plants on the floor (roots down) and pack them tightly. If moderately moist, the celery will keep well for 1 to 2 months.

Do not store celery in a cellar with turnips or cabbages; they taint the flavor of celery.

## Endive

Endive kept in a storage cellar under conditions described for cellar storage of celery will keep for 2 or 3 months. When storing endive in a cellar, tie the leaves together to help blanching.

## Onions

Onions must be mature and thoroughly dry to keep well in storage. Damaged onions and onions that have thick necks will not keep.

Store onions in a dry, well-ventilated place, such as an attic or unheated room. Keep them in well-ventilated containers such as slatted crates or open-mesh bags. Fill the bags half full and hang them on overhead hooks. Fill the crates

Hort. 1365

FIGURE 7.—Let celery tops dry off before you cover the trench.

Hort.50241

FIGURE 8.—Celery keeps well in a hotbed that is covered with boards and straw.

half full and stack them on crossbars. Do not store onions in cellars. Slight freezing will not harm onions, if they are not handled while frozen.

Onions grown from sets are hard to keep. However, one way to store them is to place them in a single layer, necks down, on poultry netting that is suspended in a cold but nonfreezing place.

## Parsnips, Salsify, and Horseradish

Parsnips, salsify, and horseradish can be left undug (stored) in the garden.

These vegetables withstand freezing, but alternate freezing and thawing damages them. If you store them in the ground, mulch them lightly at the end of the growing season. Keep them covered until outdoor temperatures are consistently low. Then remove the mulch to permit thorough freezing. After they have frozen, mulch them deep enough to keep them frozen.

These vegetables may also be stored like other root crops (p. 14).

## Peppers

Mature-green bell peppers can be kept in home storage for 2 or 3 weeks if they are properly handled. Firm, dark-green peppers are best for storage.

Pick peppers just before frost. Then wash them and sort them according to maturity and firmness.

Close control of moisture and temperature conditions is needed for successful storage of peppers. A polyethylene liner with twelve to fifteen ¼-inch holes placed in a container such as a lug box is a good way to maintain high humidity. The temperature should be between 45° and 50° F. Serious decay can occur at 40° or lower in 3 weeks.

Hot varieties of peppers are easiest to store after they are dry. You can dry them in two ways:

1. Pull the plants and hang them up; or —

2. Pick the peppers from the plants and string the peppers up on a line.

Store dry peppers in a cool, dry place such as an attic or unheated room. Do not store them in cellars.

## Potatoes

Potatoes that are to be stored require special handling at harvesttime. Dig potatoes carefully and remove them promptly from the garden to prevent sun and wind damage. If late blight is

present, delay digging until potato vines are dead and dry.

Store only sound potatoes free of serious cuts and bruises.

#### *Early Potatoes*

Because outdoor temperatures usually are high when early-crop potatoes are harvested, cool storage conditions are difficult to maintain. However, you can hold the temperature of early potatoes down near 70° F. at harvestime by digging them in early morning.

After harvest, cure early potatoes by holding them in moist air for 1 to 2 weeks at 60° to 75° F. The curing heals skinned areas and small cracks, and thus helps to prevent decay.

Do not spread freshly harvested potatoes in windy or sunny locations to cure them. If you do, wounds will not heal and damaged tissues will dry out and become discolored. Coating potatoes with hydrated lime is not recommended.

Decay of early potatoes is not likely to be a problem if you store them at 70° to 75° F. Losses become serious, however, at 80° or above. A storage temperature of 60°, if obtainable, would be ideal for keeping early potatoes 4 to 6 weeks.

In areas that have mild temperatures in summer, early-crop potatoes can be left in the ground until fall and dug as needed. If you keep potatoes in the ground, bank (or ridge) soil around the plants when you cultivate in late summer. This will protect the potatoes from light, which causes them to turn green, and will allow good drainage. Do not keep potatoes undug in the garden if you live in an area that has high temperatures and heavy rainfall.

#### *Late Potatoes*

Late-crop potatoes are better than early-crop potatoes for long-term storage. Since outdoor temperatures usually are low when late-crop potatoes are harvested, cool storage conditions are easy to maintain.

After harvest, cure late potatoes by holding them in moist air for 1 to 2 weeks at 60° to 75° F. Wounds do not heal at 50° or below. After curing, and as soon as outdoor temperatures permit, lower storage temperature to about 35° to 40° for winter storage.

Late potatoes keep well for several months in basement storage rooms, in cellars, or in cone-shaped pits. The potatoes keep best in moderately moist air. Store potatoes in the dark to prevent them from turning green.

Potatoes stored at about 35° F. for several months tend to become sweet. This condition usually can be corrected by holding the potatoes at about 70° for a week or two before you use them.

### Pumpkins and Squashes

With proper care, hard-rind varieties of winter pumpkins and squashes will keep for several months.

Harvest them before frost, and leave a piece of stem on them when you cut them from the plants.

Store only well-matured fruits that are free of insect and mechanical injuries.

Pumpkins and squashes for long-term storage keep better if they are cured for 10 days at 80° to 85° F. If these temperatures are impracticable, put the pumpkins and squashes near your furnace to cure them. Curing hardens the rinds and heals surface cuts. Bruised areas and pickle-worm injuries, however, cannot be healed.

After curing the pumpkins and squashes, store them in a dry place at 55° to 60° F. If stored at 50° or below, pumpkins and squashes are subject to damage by chilling. At temperatures above 60°, they gradually lose moisture and become stringy.

Acorn squashes will keep well in a dry place at 45° to 50° F. for 35 to 40 days. Do not cure acorn squashes before storing them. They turn orange, lose moisture, and become stringy if cured for 10 days at 80° to 85° or if stored at 55° or above for more than 6 to 8 weeks.

A dark-green rind at harvest is an indication of succulence and good quality.

Do not store pumpkins and squashes in outdoor cellars or pits.

### Root Crops (Miscellaneous)

Root crops such as beets, carrots, celeriac, kohlrabi, rutabagas, turnips, and winter radishes should not be put in storage until late fall. These crops withstand autumn frosts and are better off in the garden until nights are cold enough to permit proper storage temperatures.

Dig root crops when the soil is dry, and immediately prepare them for storage. Cut the plant tops about one-half inch above the crown. You may wash the roots if you let them dry off before storing them. Do not expose them to drying winds; and see that they are cool when you put them in storage.

Root crops keep best between 32° and 40° F. They require high humidity to prevent shriveling. Continued storage at 45° causes them to sprout new tops and to become woody.

Turnips and rutabagas give off odors; do not store them in your basement or home cellar. You may store them with other root crops and vegetables in an outdoor cellar or pit. Turnips may be left in the garden longer than most other crops. They withstand hard frosts, but are damaged by alternate freezing and thawing.

All other root crops can be stored together in your basement storage room or home cellar. Root crops keep their crispness longer when bedded in layers of moist sand, peat, or sphagnum moss. However, polyethylene bags and box liners with about four ¼-inch holes are easier to use than bedding. Root crops can be stored in crates or boxes in moist air, but they gradually lose moisture and quality unless polyethylene liners are used.

A cone-shaped pit (p. 4) is a good storage place for root crops;

but only in areas where the root crops can be protected from freezing.

### Sweetpotatoes

Sweetpotatoes that are well matured, carefully handled, and properly cured can be kept until April or May at 55° to 60° F.

Sweetpotatoes are easily bruised and cut. Handle them carefully and as little as possible. Put them directly in storage containers at harvest.

Cure freshly dug sweetpotatoes by holding them for about 10 days under moist conditions at 80° to 85° F. In the absence of better facilities, sweetpotatoes can be cured near your furnace. To maintain a high humidity during curing, stack storage crates and cover them with paper or heavy cloth. If the temperature near your furnace is between 65° and 75°, the curing period should last 2 or 3 weeks. At the end of the curing period, move the crates to a cooler part of your basement or house where a temperature of about 55° to 60° can be maintained.

In houses without central heating, sweetpotatoes can be kept behind a cookstove or around a warm chimney. If you keep sweetpotatoes this way, wrap them in fireproof paper (to slow down temperature changes) and store them in boxes or barrels.

Sweetpotatoes are subject to damage by chilling. Do not store them at 50° F. or below.

Outdoor pits are not recommended for storage of sweetpotatoes, because the dampness of outdoor pits encourages decay.

### Tomatoes

With special care, tomatoes can be stored in fall for about 4 to 6 weeks. Tomatoes taken from nearly spent vines usually are not as good as tomatoes from vigorous vines and are more subject to decay. Therefore, plant tomatoes late in the planting season so vines will be vigorous when you are ready to harvest.

Harvest tomatoes just before the first killing frost. If an unexpected frost occurs, tomatoes not damaged by freezing can be salvaged and ripened. If you live in an area where outdoor temperatures are likely to range between 32° and 50° F., harvest tomatoes within 4 to 5 days after such temperatures occur to prevent damage by chilling.

Pick tomatoes from the plants. Remove the stems to prevent them from puncturing tomatoes.

After harvesting tomatoes, wash them and let them dry off before you store them. Wiping the soil from tomatoes is not recommended because it causes sand scarring, which may lead to decay.

Store tomatoes that show red in separate containers from green tomatoes. This reduces bruising and separates tomatoes that can be used first. Pack green tomatoes one or two layers deep in shallow boxes or trays for ripening.

Mature green tomatoes reach an eating-ripe stage at 65° to 70° F. in about 14 days. Ripening can be slowed down by holding the tomatoes at 55°. Do not hold tomatoes at 50° or below for more than a

few days. At 55° mature-green tomatoes need about 25 to 28 days to ripen. Less mature green tomatoes need more time to ripen.

An airy cellar or outbuilding where temperature can be maintained at about 55° to 58° is satisfactory for holding tomatoes. A room with moderately moist air is best. Too much dampness encourages decay. If the room is too dry, the tomatoes—especially the more immature ones—will shrivel before they ripen. Wrapping tomatoes helps to slow down moisture loss, but is not completely effective in a dry room. Polyethylene-film bags and box liners, if perforated, help prevent shriveling, but they may increase decay.

Stored tomatoes should be sorted at 7- to 10-day intervals. Separate tomatoes that show red from those that are still green. Remove tomatoes that show decay.

## STORING FRUITS

Only fruits that mature late in fall or that can be purchased on the market during winter can be considered for home storage. Most fruits that can be stored keep best at 31° F.

If you store a large quantity of fruit each year, special storage facilities should be provided.

Apples, pears, grapes, and other fruits absorb odors from potatoes and certain other vegetables. Storing fruits and vegetables together, therefore, is not recommended.

### Apples

The length of time that apples can be stored depends on variety, maturity and soundness at harvest, and storage temperature. For long-term storage, the temperature should be as close to 32° F. as possible. The rate of ripening or softening of apples at a given temperature after harvest depends on the variety. In general, apples ripen about four times as fast at 50° as at 32°. They become overripe rapidly at 70° or above.

Apples can be stored successfully at home if the weather turns cold soon after harvest. In many sections, however, temperatures remain moderate for a month or more after the normal harvest date of many varieties. Varieties that mature in September — for example, Grimes Golden and Jonathan—cannot be kept long. Golden Delicious, Delicious, and Stayman will become overripe in 3 to 4 weeks if temperatures are not below 50° F. Late-maturing varieties such as Yellow Newtown (Albermarle Pippin), Winesap, Arkansas (Mammoth Black Twig), and York Imperial are best for storage in the home.

Apples keep best in cellars that can be cooled by frosty night air in fall and can be maintained at a low temperature (about 31° F.) until early spring.

Apples can be stored in many ways, but they must be protected from freezing (28° to 30° F.) and shriveling. For example, when days and nights are cold, apples can be stored in insulated boxes

in outbuildings, in hay in a barn, in straw-lined pits, or in soil- and straw-covered barrels. These methods of storage, however, will not protect apples against freezing if outdoor temperatures remain below 10° F. If you store apples in a pit, cover them with straw and then paper to keep them dry.

Pick apples when they are mature but still hard. Red apples should be well colored at harvest.

See that apples you store are free from insect and mechanical injuries. Do not store apples that have glassy spots in the flesh, known as "water core."

Stored apples need moderate moisture to prevent shriveling. Perforated polyethylene bags and box liners are useful to prevent shriveling of all varieties of apples, particularly Grimes Golden and Golden Delicious. Do not seal or tie the bags or liners; and see that they have about ten to twelve ¼-inch holes to permit ventilation and to maintain a desirable humidity. Decay is encouraged if the humidity is too high, especially if the temperature is much above 32° F.

For best results, each variety should be ripened and eaten at its peak of quality. Do not store apples too long.

### Citrus Fruits

Citrus fruits can often be purchased to advantage at wholesale prices and, therefore, may be desirable for storing in the home.

Citrus fruits may be stored in a fruit cellar for short periods, if the storage temperature is kept as close to 32° F. as possible, but not freezing.

### Grapes

In northern sections of the country where grapes mature as outside temperatures approach 32° F., it is possible to keep grapes for a month or two, if the grapes are fully ripe and free of decay at harvesttime.

Store grapes in a cold, moderately moist place. Because grapes absorb odors from other vegetables and fruits, they should be stored alone or in a fruit cellar. Among grape varieties produced in the Northeast, Catawbas have the best keeping quality, but other varieties can be kept satisfactorily.

### Pears

For proper flavor and texture, pears must be ripened after harvest. Pick pears when they are fully mature, but still hard and green. Pears are ready for picking when they change from deep green to pale green.

Bartlett and Kieffer pears are usually ripened immediately after harvest at 60° to 65° F. and are canned or preserved. Kieffer pears require 2 to 3 weeks to ripen. Bartlett pears ripen faster than Kieffer pears.

Store pears with apples or under similar conditions. See that pears are cool and free of defects when you put them in storage.

If pears are stored too long or at too high a temperature or if the temperature for ripening is too high (75° F. or above), they break down without ripening.

You can get a free copy of Home and Garden Bulletin 78, "Storing Perishable Foods in the Home," from the U.S. Department of Agriculture, Washington, D.C. 20250. Send your request on a post card. Please include your ZIP Code.

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