

South Dakota State University
**Open PRAIRIE: Open Public Research Access Institutional
Repository and Information Exchange**

Cooperative Extension Circulars: 1917-1950

SDSU Extension

8-1918

Vegetable Storage

F. E. McCall

Follow this and additional works at: http://openprairie.sdstate.edu/extension_circ



Part of the [Agriculture Commons](#)

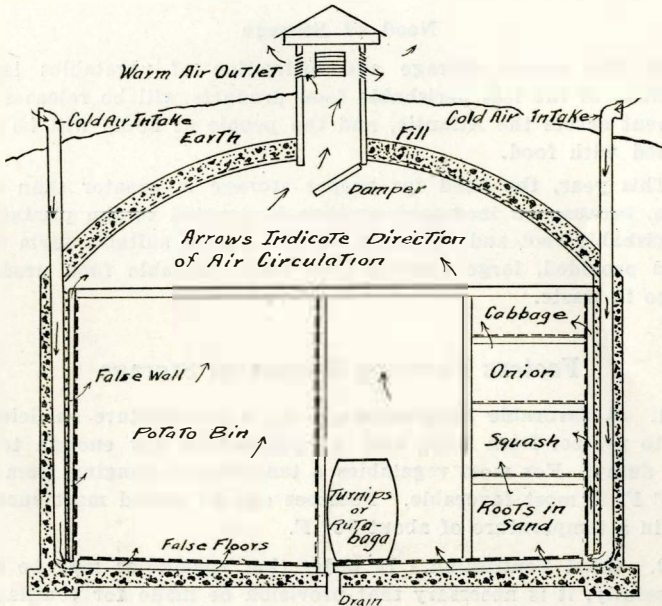
Recommended Citation

McCall, F. E., "Vegetable Storage" (1918). *Cooperative Extension Circulars: 1917-1950*. Paper 9.
http://openprairie.sdstate.edu/extension_circ/9

This Circular is brought to you for free and open access by the SDSU Extension at Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in Cooperative Extension Circulars: 1917-1950 by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact michael.biondo@sdstate.edu.

VEGETABLE STORAGE

F. E. McCALL
Extension Horticulturist



Cross Section of Air Cooled Cellar

EXTENSION DIVISION
SOUTH DAKOTA STATE COLLEGE OF
AGRICULTURE AND MECHANIC ARTS

C. LARSEN, DIRECTOR

Brookings, South Dakota

Farm Storage

Need of Food

A nation at war is a nation with a food problem. A nation with a food shortage is a nation in peril. In the face of the present world food situation food products of all classes must necessarily be conserved in order that the demands of the nations for food may be met.

Need of Storage

By the proper storage and utilization of vegetables larger quantities of the less perishable food products will be released for shipment across the Atlantic, and the people at home will be well supplied with food.

This year, the need for proper storage is greater than ever before, because an increased acreage is devoted to the production of perishable root and vegetable crops. Unless suitable farm storage is provided, large quantities of these valuable food products will go to waste.

Factors Favoring Successful Storage

1. **A favorable temperature**, i. e., a temperature sufficiently high to protect from frost, and a temperature low enough to retard decay. For most vegetables a temperature ranging from 34° to 38° F. is most favorable. Potatoes can be stored most successfully in a temperature of about 38° F.

2. **Good Ventilation**. In order that vegetables may be kept successfully, it is necessary that provision be made for ventilation. Dead air favors the development of decay and the accumulation of moisture on the roof and walls of the store-room, and tends to dripping, which is very objectionable. Ventilation can usually be secured by providing the store-room with a number of vents of good size, which may be opened or closed as the condition within demands. Good ventilation will also keep the moisture contents of the air more uniform.

3. **Condition of crop**. Roots or tubers to be placed in storage should be mature and in an entire condition. Roots or tubers that have been bruised or injured by careless lifting are much more likely to decay than those that have been carefully handled. Such crops as carrots, beets and potatoes, especially if wet when dug, are sometimes better stored temporarily under a slight covering in the field, rather than put at once into a permanent storehouse during warm or moderate fall weather. This gives them a chance to dry and "sweat." They must not, however, be permitted to

freeze. Be careful that vegetable tops are not mixed with the tubers or roots, as these will set up decay.

4. **Air Circulation.** Good results are obtained if roots or tubers are stored in bins with slatted sides and floor. This will provide for a free circulation of air about the tubers, and will greatly retard decay due to sweating or overheating. Where large quantities must be piled together, place large slatted ventilating shafts up through the piles of vegetables.

5. **Size of Bins.** It is not well to make the bins large, nor to pile the roots or tubers too deeply. Where large quantities are piled together, they are much more likely to overheat than when put in smaller bins. Bins 6 or 8 feet by 10 feet are of a good size for root storage. A depth of 4 or 5 feet, with plenty of head room, will give better results than a greater depth.

6. **Racks.** Some vegetables, particularly onions and cabbage, will keep much better if stored in open racks. The rack should be constructed with slatted floor and sides so that the air may circulate freely all around the stored product.

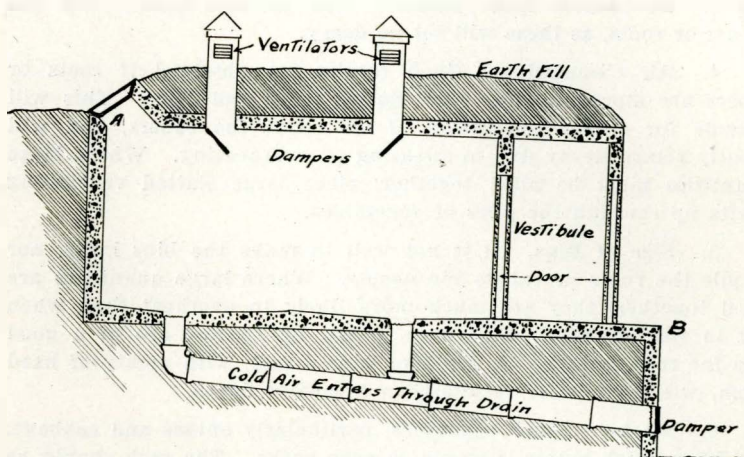
7. **Good Drainage.** The root-house or storage-room should be so placed or located that perfect drainage will be provided. Excessive moisture on the floor or about the sides increases the humidity within the storage-room, and excessive humidity favors decay.

8. **Cleanliness.** One of the first requisites for a storage cellar is that it should be clean and sanitary. Yet how often is that essential ignored! The house itself may be kept scrupulously clean and the cellar underneath it be entirely overlooked. Rubbish and decaying matter hold filthy sway in the dark, damp corners, and disorder rules supreme. Bacteria and fungi flourish in such places, causing heavy losses that might have been avoided. The cellar should be cleaned out in the fall and again in the spring and kept that way. Especially should decaying fruit and vegetables be removed at once.

9. **Ease of Access.** Another requirement is that of easy access. One of the disagreeable jobs of life is to carry produce in or out of a cellar that has a low, dingy, winding, rickety entrance. Comfort and convenience in such matters should be considered, even though this increases the expense somewhat.

The Outside Cellar

Various types of outside cellars are in use, ranging from the triangularly topped kind for temporary use to the arched-roof concrete cellar that is built as a permanent structure. The farmer



A hillside plan

should consider his needs in deciding whether to build a cheap, temporary cellar or a good, permanent one, remembering that what is cheapest at first may not be so in the end.

The outside cellar is built either partly or entirely under ground, depending largely upon the location. If the home is near a hillside, it would facilitate entrance to the cellar and be very desirable from many other standpoints to build the cellar in the side of the hill. If the region is subject to cold winds, the cellar should be built behind a protecting shelter if compatible with the other requisite conditions. Where exposure to the wind cannot be avoided, it is well to build the cellar parallel to the prevailing winds.

The location should be well drained. If this is the case, a dirt floor is satisfactory and has the advantage of being inexpensive and of being a means of supplying moisture to the air by evaporation from the soil.

Frequently the soil is of such a nature that simply a hole dug in the ground and unwallled, covered with a roof is all that is necessary for a cheap cellar or "cave" as it is sometimes called. For this a rectangular hole is dug in the ground and the walls squared up. If the width of the cellar is more than a few feet a ridge pole must be provided and adequately supported. The roof may then be made of poles laid closely together covered with straw and soil or a frame roof properly insulated may be constructed.

The Storage House

In certain parts of the country one finds large, well-equipped houses for the storage of tubers or vegetable crops. Where this is the case, the soil or climate is especially suited to the production of those particular crops, and the farmer makes a specialty of growing one crop on a large scale, as do the Maine and Colorado potato growers. For the ordinary farm, however, the conditions do not justify the erection of a large, specialized, and expensive house for any particular crop. Most farmers must be prepared to store smaller amounts of several crops, and under those conditions the outside cellar rather than the large storage house best meets their needs.

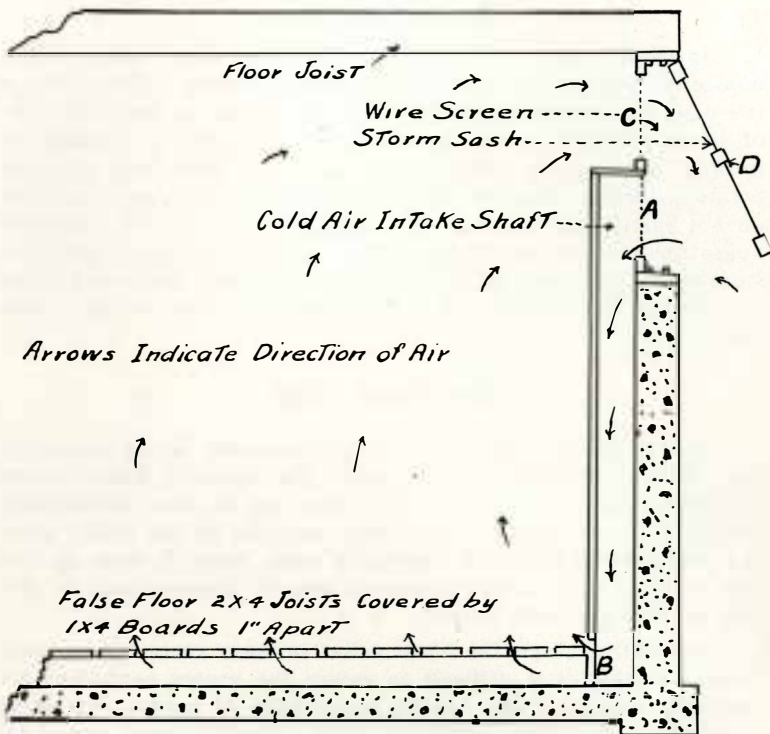
The House Cellar

A very common place for storing vegetables is the house cellar. Where the conditions are right, this makes a desirable and convenient place. Often, however, there are so many unfavorable conditions in the actual arrangement and use of the cellar under the living rooms that it is frequently much better to have an outside cellar in spite of the somewhat greater inconvenience of getting at the supplies in winter.

In the first place, the house cellar in many cases has so many other uses that it is difficult to secure the proper conditions for vegetable storage. This applies particularly to cellars containing a furnace, coal room, kindling room, laundry, junk room for trunks, clothes boxes, tools, and miscellaneous materials, and an awkward entrance through the house. Provided a separate room, or better, two rooms, one for vegetables requiring high humidity and one for those which do better in a dry atmosphere—could be well partitioned off from the rest of the cellar and with a convenient entrance, the house cellar answers the purpose very satisfactorily. One of the chief advantages of a vegetable cellar under the house is its accessibility whereby the supplies can be obtained when needed without the discomfort of going outdoors. The house cellar should be especially well ventilated and the decaying matter removed as soon as it forms, since the odors from putrefying vegetation are injurious to the health of the occupants of the house. For sanitary reasons also the sunlight should have some access to the cellar.

The following cut illustrates how a basement vegetable room may be ventilated.

One of the window glasses should be removed, the lower half of which should open into a shoot A—which draws the outside air down to the floor coming into the room at B. The upper half of



An easy method of properly ventilating a basement storage room
Cross-section of air-cooled cellar

the opening C should be screen wire: this will permit the foul warm air, which collects near the ceiling, to escape. As the weather becomes too severe outside, the storm sash D should be closed.

The Storage Pit

For the outdoor pit, a well drained spot should be selected. In a rectangular or circular area 6 or 8 feet across, the ground should be hollowed out 6 to 12 inches deep. Pits may be made any desired length, but they should not be over 6 to 8 feet across. A layer of clean dry straw should be placed on the bottom of the excavation. The roots are poured on top of the straw until a conical or circular pile is built up with the lower outer edge even with the outer line of the excavation. Cover with clean dry straw to a depth of 6 inches when well pressed. As the weather becomes

cooler, throw on 3 inches of dirt and, before the ground freezes, increase the dirt covering to 10 to 12 inches.

Danger

If the roots are covered to the full depth at first, there is danger of heating and rotting. When this covering has frozen to a depth of 2 or 3 inches, a further covering of 12 inches of straw or leaves can be applied or enough should be added to keep the frost from injuring the roots. Parsnips and salsify need not be covered so deep.

Ventilation

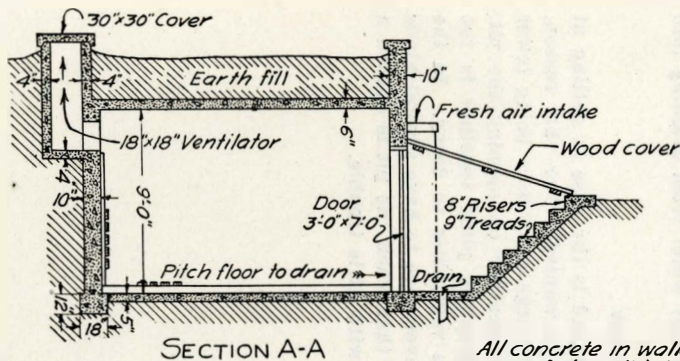
When dirt is first applied, allow some straw to project up through the dirt at the top of the pile in order to provide ventilation. This can be closed over during the severest weather. In the case of large pits it may be well to put in a square ventilating flue made of 6-inch boards. This should be placed in the center of the pile and should extend well among the roots.

Opening the Pit

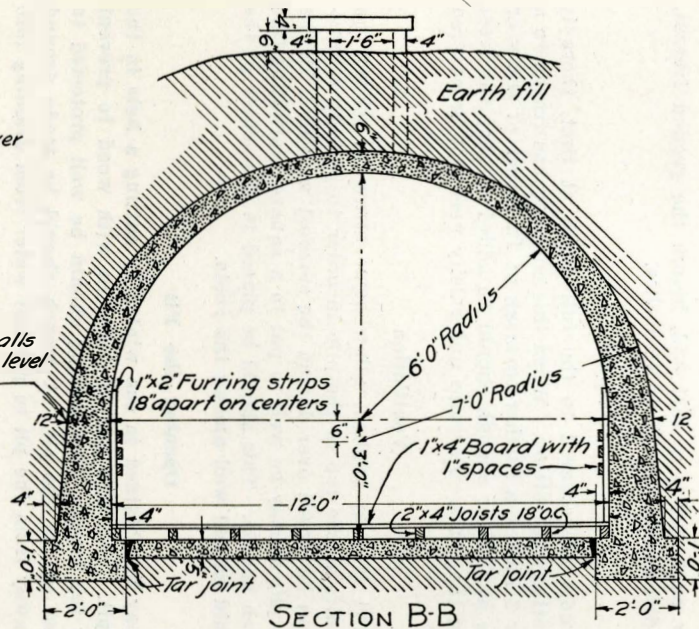
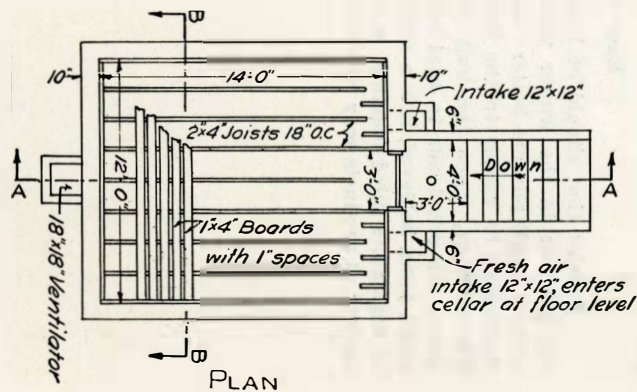
Roots may be obtained in the winter by cutting a hole in the side of the pit. The hole can be cased in with wood to prevent its becoming too large. The opening should be well protected to keep the frost out of the pit. A trench should be made around and leading away from the pit to prevent water from draining into it.

Ease of Access

A point that should be kept in mind is the ease in getting at the produce in the winter when it is wanted. For this reason, several small pits are better than one large one, there being fewer vegetables to expose to the freezing weather on opening the pit. Furthermore, when the bulk of vegetables piled together is too great, the pile tends to heat and the vegetables to decay. In the small piles, however, it is a great convenience to have several kinds of vegetables piled together in order that when the pit is opened a variety of products may be obtained with little trouble.



All concrete in walls
and roof above this level
of 1:2:3 mix.



MATERIALS REQUIRED
 45 Bbls cement
 14 1/2 Cu. yds. sand
 22 1/2 Cu. yds. pebbles

Concrete storage cellar for the average farm. Capacity about 600 bushels of potatoes. This cellar can also be used as a storm cave or cooling room for milk.

A concrete storage cellar. Prepared by Portland Cement Association

The Air Cooled Cellar

(See figure on cover page)

Since cold storage is impossible on the farm, one practical solution of the farm storage problems for fruit and vegetables is the air cooled storage cellar.

Storage cellars for farm fruits and vegetables in South Dakota are best when built wholly or at least partly underground. Fruits, potatoes and other root crops are kept best at a temperature of 40° F. The normal temperature of the ground is approximately 50°, which is too high for ideal storage conditions. Consequently, a cellar or cave, even though wholly underground with no cooling system, is generally too warm.

The air cooled cellar is equipped with:

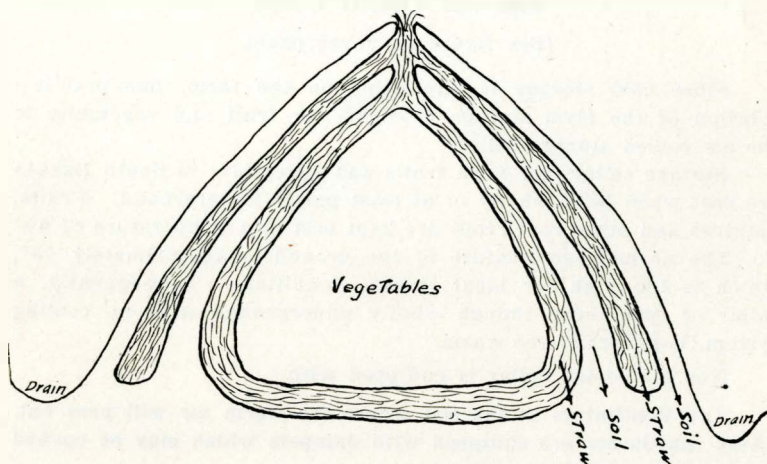
(a) Ventilators at the top where the warm air will pass out. These ventilators are equipped with dampers which may be opened or closed as conditions warrant.

(b) Cold air intakes which open into the cellar from the side walls just above the floor lines. These intakes may be constructed of 6 inch sewer pipe joined one above the other just outside or in the wall. A damper is attached at the top so that the amount of air coming in may be regulated.

To secure the best circulation false floors and walls constructed of 2x4 joints and studs covered by 1x4 boards nailed one inch apart should be provided. This will permit the cool air to pass underneath and on all sides of the stored contents, in this way cooling them.

Usually during the fall months when the crops are stored, the night temperature drops near or below the freezing point. If the cellar is equipped with a good circulating system it can be opened up during these cool nights. The cold air comes through the cold air intakes (B), and the warm air passes out through the ventilator (A). In this way the air may be changed many times during the course of a single night, thus thoroughly cooling the cellar before morning. In the early morning the cellar should be closed and not opened until the weather will permit without again warming up the interior. The temperature can be regulated if proper attention is given. In very severe weather the cold air intakes should be closed.

To hold roots and tubers in a healthy vigorous condition, correct storage must be provided constant temperature: normal atmospheric moisture, correct ventilation, protection against frost—these are important conditions to be secured.



The storage pit

Storage Table

Beets—

Best storage temperature— 34° – 38° F.

Though capable of standing a little frost, beets should not be severely frozen before harvesting. If for table use, the leaves of the beets should be twisted off rather than be cut off with a knife. Keep better if mixed in sand.

Cabbage—

Best storage temperature— 34° – 38° F.

Demand a good circulation of fresh air. Are best piled not too deeply on slatted shelves, so as to permit of airing. Small numbers may be suspended from the ceiling by hanging by roots. If in small numbers, cabbage can be kept better with roots on. Where quantities must be piled in bulk, put hollow, slatted ventilating shafts up through the center of the pile. If cabbages freeze, thaw them very slowly.

Carrots—

Best storage temperature— 34° – 38° F.

Should be in a dark, cool place. Keep better if mixed in sand.

Cauliflower—

Best storage temperature— 34° – 38° F.

Heads heat very quickly if stored in piles. Heads must not touch. Retain leaves and pile on shelves.

Celery—

Best storage temperature— 34° – 38° F.
(Late Varieties)

A difficult crop to store. Most successfully kept by standing plants on end in slightly dampened sand. Trim off leaves and outside roots before storing.

Citrons—

Should not be stored. Preserve without too great delay.

Corn—

Green corn may be canned, but not stored.

Cucumbers—

Should not be stored.

Kohl-Rabi—

Should not be stored. Best if used when not too mature.

Onions—

Best storage temperature—34°–38° F.

Should be spread on slatted shelves so as to permit of free air circulation. Layers should not exceed ten inches deep. Will taint other vegetables if stored alongside. If they freeze, keep them frozen as long as possible, as alternate freezing and thawing will cause rot. Immature onions, or those with thick necks, should not be stored. Dry onions well before storing.

Parsnips—

Best storage temperature—34°–38° F.

For winter storage dig very late in the fall. Keep better if covered with moist sand so as to prevent drying. A few for spring use may be left in the garden all winter and dug before the tops have again grown 2 inches.

Potatoes—

Best storage temperature—34°–38° F.

May be piled in bulk. Good ventilation is an advantage, and the bin should be kept away from the outside wall. For proper storing, there must be no unsound tubers, which would spread decay. One of the easiest vegetables to store. Avoid sunlight.

Pumpkin—

Best storage temperature—40°–45° F.

Store in a dry place, leaving on the stem or stalk end. Do not bruise.

Radish—

(Winter)

Best storage temperature—34°–38° F.

May be stored same as turnips. Should not be permitted to dry too much.

Salsify—

Best storage temperature—34°–38° F.

Read remarks regarding parsnips.

Squash—

(Winter)

Best storage temperature—40°–45° F.

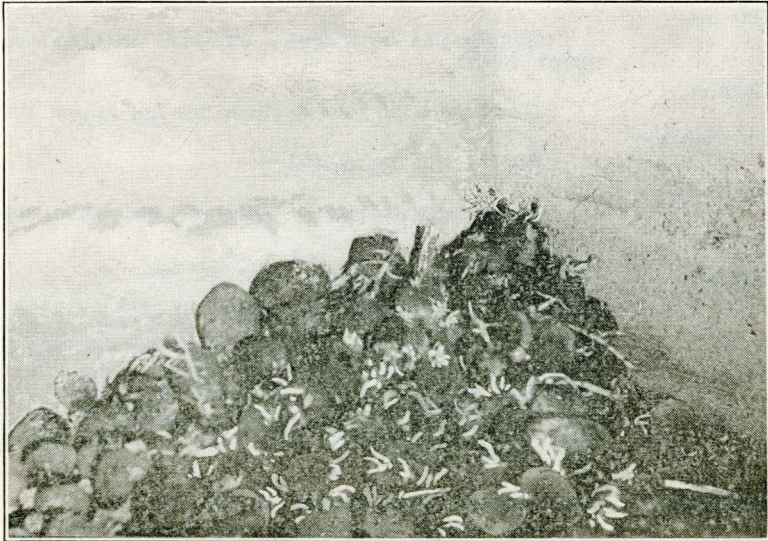
Read remarks regarding pumpkins.

Turnips—

(Swedes)

Best storage temperature—34°–38° F.

May be piled in bulk. Atmosphere should not be too moist. Keep better if not cut or bruised. One of the easiest vegetables to store.



Showing condition of potatoes improperly stored in house cellar

Cooperative Extension Work in
Agriculture and Home Economics,
South Dakota State College and
U. S. Department of Agriculture,
Cooperating