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Plan of Potato Storage Cellar

Michigan State University Extension Service

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Issued May 1930

8 pages

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## PLAN OF POTATO STORAGE CELLAR

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Michigan potato growers suffer heavy financial losses every year as a result of inadequate storage facilities. Approximately twenty million bushels of potatoes are stored in this state for a period of two months or longer each year.



Fig. 1.—A permanent storage cellar built in side hill.

Some of the most common storage losses occur from insufficient insulation of storage walls and ceilings, permitting the potatoes to become chilled or frosted. Potatoes exposed to frost are not satisfactory for food or seed purposes. They break down during transit and one or two frosted potatoes in a sack may spoil the appearance of the entire sack of potatoes. A uniform temperature of 36° to 40° Fahrenheit should be maintained during the storage period.

**MICHIGAN STATE COLLEGE**  
**Of Agriculture and Applied Science**  
**EXTENSION DIVISION**  
**R. J. Baldwin, Director**

Printed and distributed in furtherance of the purposes of the co-operative agricultural extension work provided for in the Act of Congress May 8, 1914, Michigan State College of Agriculture and Applied Science and U. S. Department of Agriculture, co-operating.



Insufficient ventilation is another common cause of heavy losses in storage. Potatoes receiving insufficient air may break down with button rot or black heart. These injuries lower the quality of potatoes for seed as well as for table stock. Furthermore, insufficient ventilation provides ideal conditions for the development of molds and fungous diseases that often occur in storage. By means of false floors, floor flues, and ventilated bin partitions, air can be distributed through the storage house so that no potatoes are farther than five or six feet from a supply of fresh air.

The storage house shown here has been designed for the grower of certified seed who stores his own seed, or for the grower of table stock who stores at least a part of his crop at home. It has a capacity of approximately 3,000 bushels, although the size may be altered to meet individual requirements. Each bin will hold 360 bushels if the



Fig. 2.—An excellent use of field stone. Such a house is economical, easily constructed and durable.

potatoes are stored six feet deep. The eight bins will then hold 2,880 bushels.

The depth of potatoes in any bin should not exceed six feet. If stored to a greater depth, the air space between the top of the potatoes and the ceiling will be too small for efficient circulation of air over the top of the bins. As a result of this inadequate ventilation, the tubers, especially on top of the bins, may become damp. This condition is favorable for the growth of fungous diseases.

In case of a larger crop in some years, it may be desirable to use part of the alley for storage space. In such an emergency this cellar has a total capacity of more than 3,000 bushel, but the potatoes should not be piled too deep. Perhaps five feet should be the maximum depth, so that additional space above the bins is available for the circulation of air.



As soon as the potatoes are stored they go through a sweating process. During this period, a large amount of heat and moisture is given off. Since it is very important to cool the potatoes rapidly, this heat and moisture must be removed as quickly as possible. It is estimated that 75 per cent of the damage to potatoes in storage occurs during the first few weeks. To prevent this loss it is necessary to have frequent changes of air within the storage house.

The air changes are hastened by the use of floor flues, an air space around the outside walls, and by slatted bin partitions or vertical flues distributed through the bins. The floor flues which are connected outside to the eighteen inch sewer pipe carry the cold air along the floor under each bin. As it is warmed it escapes between the slats in the flue, rises through the potatoes, and carries with it the warm air and excess moisture. The out-take ventilator then carries it from the building.

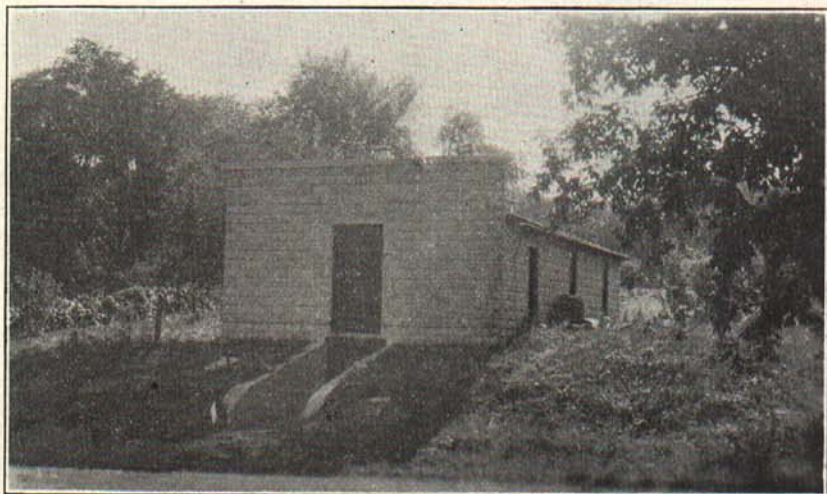


Fig. 4.—An underground storage cellar with additional storage above ground. The storage above ground must be well insulated.

The slatted bin partition aids materially in the circulation of air through the bins. The slatted wall is placed around the outside concrete wall for additional ventilation, while the one inch sheathing against the concrete will help to keep out frost.

During the first few weeks of storage, the doors should be left open. In fact, it is well to keep them open on cool nights and during the day as long as the temperature does not threaten danger from frost. With continued severe weather, it will be necessary to close the tile intake to prevent frost injury. When the tile is closed it will still be possible to obtain ventilation by removing the tight cover from that part of the floor flue in the sacking and grading room and letting the air circulate from this room through the storage house.

The sacking and grading room at the front is not essential but is



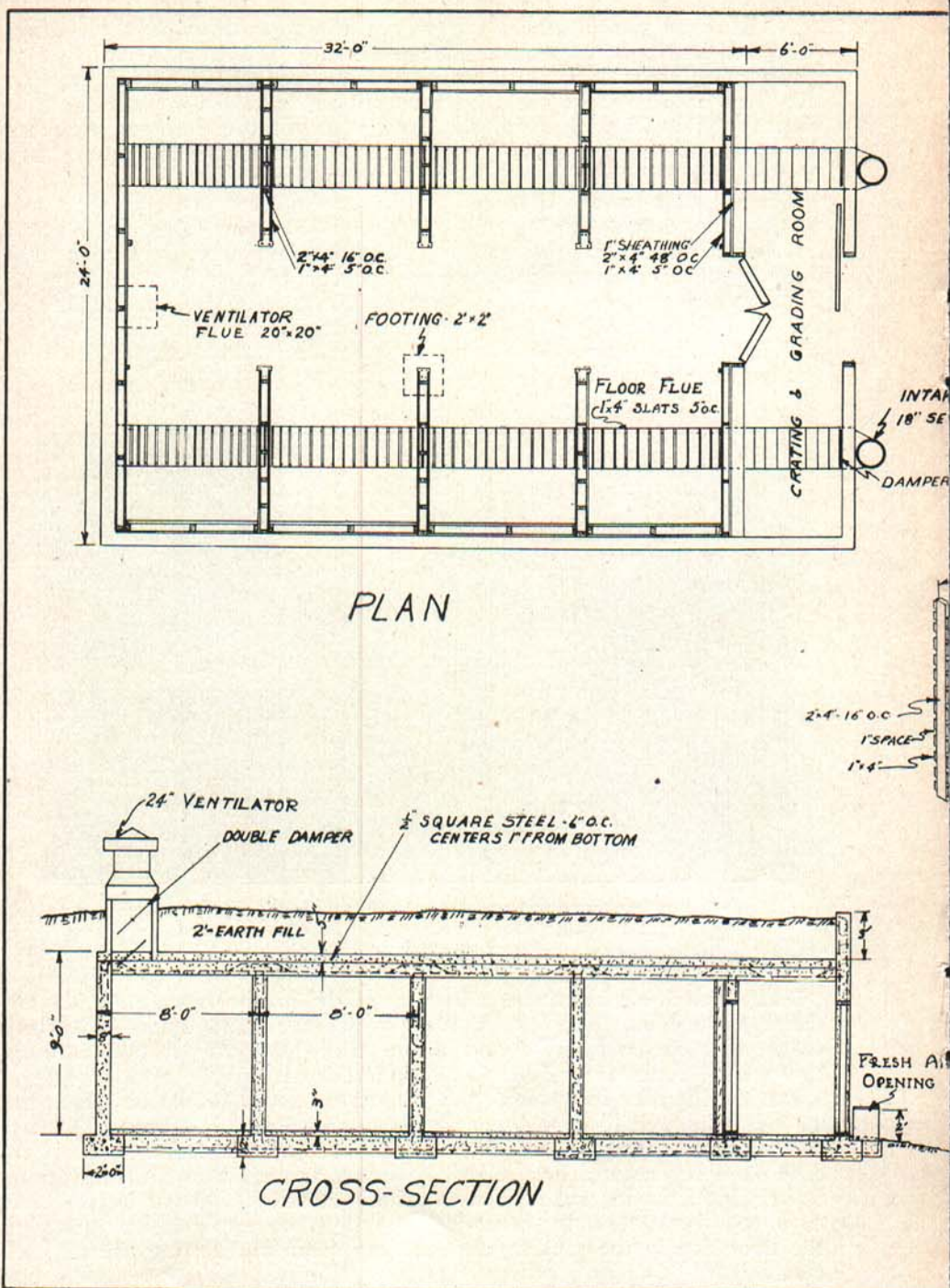
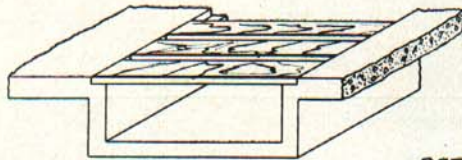
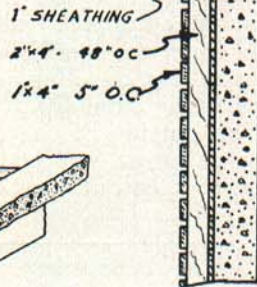
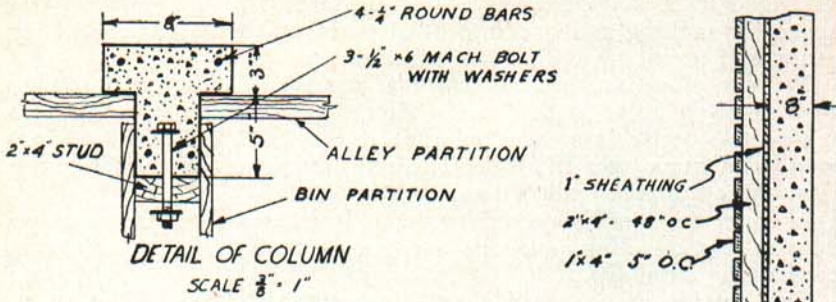
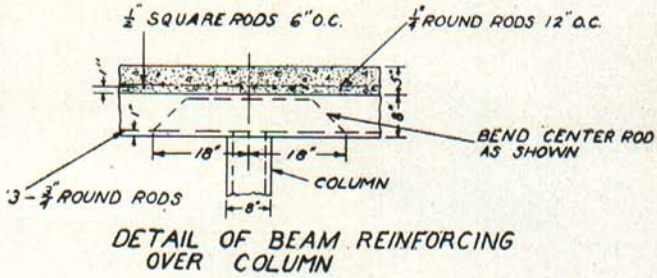
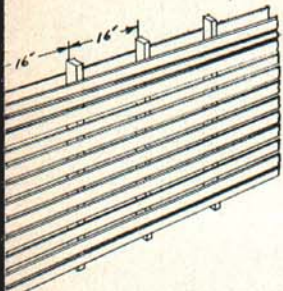


Fig. 3.—Plan of small undergrate

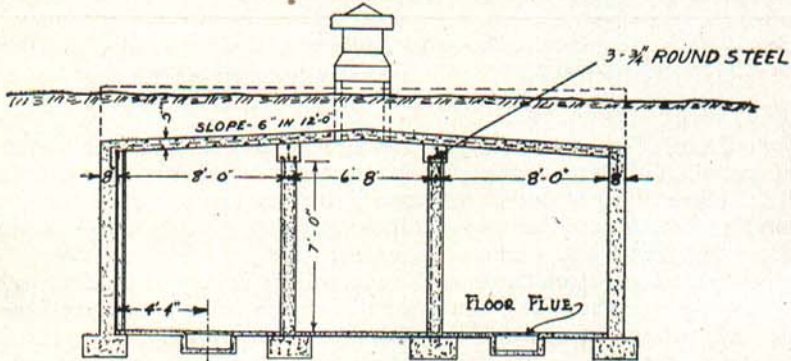


DETAIL OF WALL  
SCALE:  $\frac{1}{4}$ " = 1'-0"

VENTILATOR  
PIPE



DETAIL OF BIN PARTITION



ound concrete storage cellar.



desirable in that it provides a storage place for equipment as well as space for sacking and grading. It also aids in the regulation of temperature and humidity within the storage area.

No provision has been made for filling the bins by putting the potatoes through holes in the roof. There is no objection to this practice where the house is so located that it can be filled without driving a wagon or truck over the top. The reinforcing in the roof is not strong enough to support such a load.

A concrete floor is recommended. It is easier to clean, more convenient for handling potatoes and seems to have every advantage in controlling humidity.

The outside of the roof should be painted with hot tar or asphalt to waterproof it. At least two feet of earth over the cellar is necessary to keep out frost.



Fig. 5.—An underground cellar with driveway across one end. The small ventilating flue was found to be inadequate.

Regardless of how carefully a storage house has been designed and constructed, it will not give satisfactory results unless properly managed. Before the potatoes are stored, the house should be thoroughly cleaned and disinfected, using a solution of copper sulphate—15 pounds copper sulphate to 100 gallons of water.

Only stock free from frost and mechanical injury should be stored. Every advantage should be taken of difference in temperature between inside and outside of storage to cool the tubers rapidly.

Where electricity is available, it is considered a good practice to install a ventilating fan to aid in controlling temperature and humidity. A fan is especially desirable during the first few weeks of storage when it is desirable to move, in a relatively short time, large volumes of air through the storage house.



## LIST OF MATERIAL

### Concrete

275 bags of cement	}	1:2:4 mix
20 yards of sand		
40 yards of gravel		

### Steel

18 pcs.—12' x 3/4" rd. steel rods  
 64 pcs.—14' x 9/16" rd. steel rods  
 24 pcs.—8' x 1/4" rd. steel rods

### Lumber

Studs, 77 pcs.—2" x 4"—7'-0"  
 Plates and sills, 12 pcs. 2" x 4"—8'-0"  
 Sheathing, 1" x 6"—850 sq. ft.  
 Floor flue, 1" x 4"—125 ft.  
 64 planks for bin fronts, 2" x 8"—12'-0"  
 4 doors, 3' x 6" x 7'-0"  
 Double boarded with—196 bd. ft.  
 Insulation between—100 sq. ft.  
 Door headers—2 pcs. 2" x 4"—14'-0"

### Hardware

Nails—10 lbs.—16d  
 Nails—30 lbs.—8d  
 Hinges—8—8" strap

### Miscellaneous

Tile 4'—16" sewer tile  
 Ventilator 1—24" ventilator



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