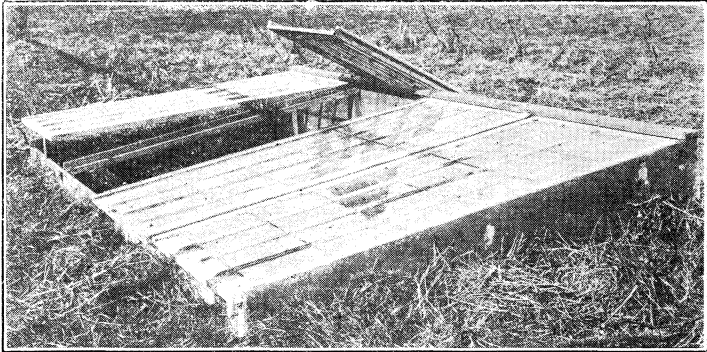


# HOT BEDS *and* COLD FRAMES



Circular No. 211

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**COOPERATIVE EXTENSION WORK  
IN  
AGRICULTURE AND HOME ECONOMICS  
State of Oklahoma**

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# HOTBEDS AND COLD FRAMES

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Early gardens, as a rule, are the most profitable. Therefore, any factor which assists in making an early garden is very desirable. It is especially important to have good, strong, healthy tomato, eggplant, and pepper plants to set out in the open ground as soon as danger from frost is past.

The complaint is quite general that "my tomato plants grow well, but all the blossoms fall off without setting fruit." Those who have observed closely have no doubt noticed that sometimes an early or late crop of tomatoes, peppers, and eggplants is produced, but fruit of these plants may not be available during the summer. One way of lessening this trouble is to have good sized, healthy, stocky plants to set out at the proper time. In this way fruit will ripen during the summer. The best way to get these plants is by starting the seed in a hotbed and transplanting them into a cold frame.

In many localities it is almost impossible to secure first-class vegetable plants of the best varieties when desired.

**Location of Hotbed.** The location of a hotbed should be (1) well drained, (2) exposed so as to get the greatest amount of sunlight throughout the day, (3) protected from the north winds, (4) facing the south.

By being located relatively high, better exposure and drainage are secured. By being located on the south side of a building, and attached to the building, if practicable, building material is saved, and the advantage of reflected heat is secured, as well as protection from the north winds. The south side of a board fence or hedge row is frequently chosen. If there is a choice between locations, nearness to the water supply should be considered.

**Cover.** Regular hotbed sash, which is usually 6 feet long and 3 feet wide, is the best material for the cover. Hotbed sashes if properly cared for will last a number of years. They afford better protection to the plants than canvas covering, give better light, and trap the heat from the sun. In the long run, hotbed sashes are cheaper than canvas. Sashes glazed with three rows of glass are good, as they admit plenty of light and at the same time are not very easily broken in handling.

For a small hotbed, where only a few plants for home use are desired, a window sash may be used. The only modification to be made in window sash is to cut down the crossbars of the sash flush with the glass so the water will run off.

Hotbeds are frequently covered with canvas or sash frames where glass cloth, cel-o-glass, or other material is substituted for glass. Regular hotbed sash, glazed with glass, if properly cared for is the cheapest and most satisfactory over a long period of time.

**Frame.** Where the hotbed is to be covered with the regular hotbed sash, 6 x 3 feet, the frame should be 5 feet 11 inches wide, and a multiple of 3 feet long. In case of a two-sash frame, which is a good size for the average home garden, it would be 6 feet long, etc. The back or north side of the frame should be 18 inches tall and the front or south side 12 inches tall. Cloth-covered frames are, as a rule, narrower than those covered by the 6 x 3-foot glass sash. The frame should always be constructed so that the pitch from the back to the front will be sufficient to shed the water.

**Pit.** The pit should be dug about 18 inches deep, the width and length depending upon the size of the frame. Assuming that it is going to be a two-sash (6 x 3 feet each) frame, the pit should be 8 feet long, 7 to 8 feet

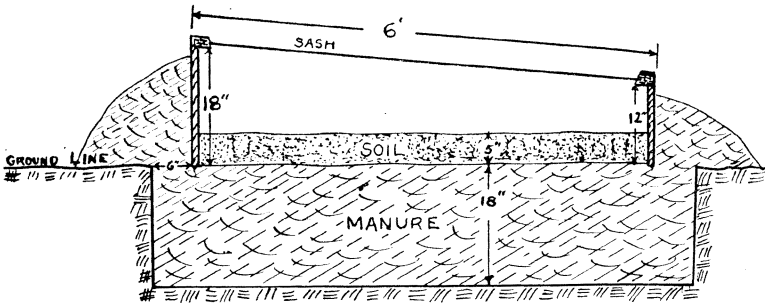


Fig. 1.—Cross Section of Hotbed.

wide and 18 inches deep. When the frame is placed on the manure, the manure will extend beyond the boundaries of the frame (see Fig. 1—cross section of hotbed). By banking manure around the outer edges of the frame the temperature will be practically the same in all parts of the frame.

**Manure.** Use fresh horse manure which contains one-fourth part of straw or other litter. Fresh horse manure gives off an even temperature. The straw is necessary so the air can get into the manure, thereby causing the rotting which produces the heat. The preparation of the manure should begin about 10 to 12 days before you expect to plant the hotbed. Pile the manure near the pit. If the manure is dry, moisten it, preferably with warm water. Moistening the manure with warm water is especially important for the small pile. In case of a small hotbed, say a one-sash frame, when only a small amount is necessary for the pit, it is usually advisable to begin with more manure than is required in order to get it properly heated. Stack the manure in fairly firm piles, otherwise it may not heat. Usually two or three days are required for the manure to heat. Repile the manure when heated, placing the inside of the pile on the outside. If dry, moisten again. In two or three days the manure should be ready for the pit. Put the manure in the pit, packing it in layers as it is placed. Firm the corners and edges well. Fill the pit level with the surface of the soil. Usually the pit is only filled with manure to within five inches of the surface of the soil, and then a 5-inch layer of soil is added.

#### PLACING THE FRAME

Place the frame on the manure and bank manure around the frame. Add a 5-inch layer of good hotbed soil inside the frame. A good hotbed soil may be made of 1 part sand, 1 part well-rotted manure, and 2 parts of garden loam soil.

Water the soil and place on the cover. The temperature in the frame is likely to run up very high for several days. Due to the moisture and heat many weed seedlings may be destroyed. When the temperature falls to about 90° F. the hotbed is ready to plant. From this it is seen that a hotbed should be started two weeks prior to the planting date.

**Additional Protection.** When very cold weather prevails during the regular hotbed season, additional protection may be necessary. In such cases old comforts, quilts, straw mats or building paper tacked on wooden frames may be used over the sash.

**Seeding.** Where it is desired to mature vegetables, such as radishes, in a hotbed, the seeding date will depend on when you desire the plants for use. In case of tomatoes, peppers, and eggplants the seeding date will de-

pend on when you expect to transplant them to a cold frame and also on how close together you plant the rows and how thickly the seed are planted in the row. First, it is assumed that the plants are to be transferred directly to the open garden. In this case plant the seed rather thinly in rows six inches apart about six weeks before danger of frost is past. When danger of frost is past by April 20, plant the seed March 6. After the plants are up and well started, begin hardening them off by exposing them to cooler temperature by increasing ventilation.

In case the plants are to be transplanted to a cold frame, plant the seed between February 15 and 25. The seed of cabbage, cauliflower, and lettuce, when started in a hotbed, should be planted from the middle to the last of January. However, it is preferable to plant the seed of these plants in the cold frame in October, and winter the plants over in the cold frame as described in Circular No. 212. (This circular may be obtained free upon request.) Sweet potatoes are usually bedded from the 15th to the 25th of March for the production of early plants.

**Watering and Ventilating.** Water the bed when the seeds are planted, and afterward whenever the bed becomes dry, doing so thoroughly. The frequency of watering will depend on the season of the year, the amount of sunshine during the day, and the size and vigor of the plants. Do not keep the bed too wet or the plants may damp (rot) off. When the surface of the soil gets dry, then water. Water the hotbed in the morning instead of the evening. During cold weather warm water is preferable to cold.

More care is necessary in ventilating a glass-covered hotbed than a canvas-covered bed. Usually when the sun comes out a glass-covered bed will require ventilation. The temperature inside the frame for tender plants such as tomato, pepper, and eggplant should run from 60° F. at night to about 80° F. in daytime, and for the cold-natured plant, such as cabbage, 50° F. to 65° F. Ventilation is secured by means of raising the sash partially or entirely at one end, opposite from the wind.

### **FLUE-HEATED HOTBEDS**

Due to scarcity of manure for hotbeds and economy of construction of flue-heated hotbeds, these are becoming common, especially among sweet potato growers.

There is a great variety of material used in the construction of the flues. Some use wood, others stovepipe, brick and tile, while some use a dirt tunnel covered with boards. In brief, the flue, in whatever form, extends from a firebox at one end through the center of the bed and into a chimney of some type at the opposite end. Whatever type is used, care in construction at the firebox end to prevent burning or excessive heat is necessary. A flue-heated hotbed requires, as a rule, a large amount of water.

The following description and cut of a flue-heated hotbed is taken from Circular 15, Alabama Extension Service, and represents a good type. Fig. 2 shows how one of these frames may be constructed. When possible, the frame should be placed on a slight slope with the firebox at the lower end, thus giving the necessary slope to the floor.

The firebox is constructed of brick and should be arched. The dimensions, as given in the drawing, are 18 inches wide, 20 inches high, and 4 feet 8 inches long (inside measurements). The terra cotta flue pipe leading under the bed is 8 inches in diameter, and should extend the entire length of the frame into the chimney at the other end. The first two or three joints of the flue should be covered with brick, as the blaze from the fire might cause it to become too hot and endanger the floor. The chimney may be made of brick, or by nailing together four 12-inch boards in

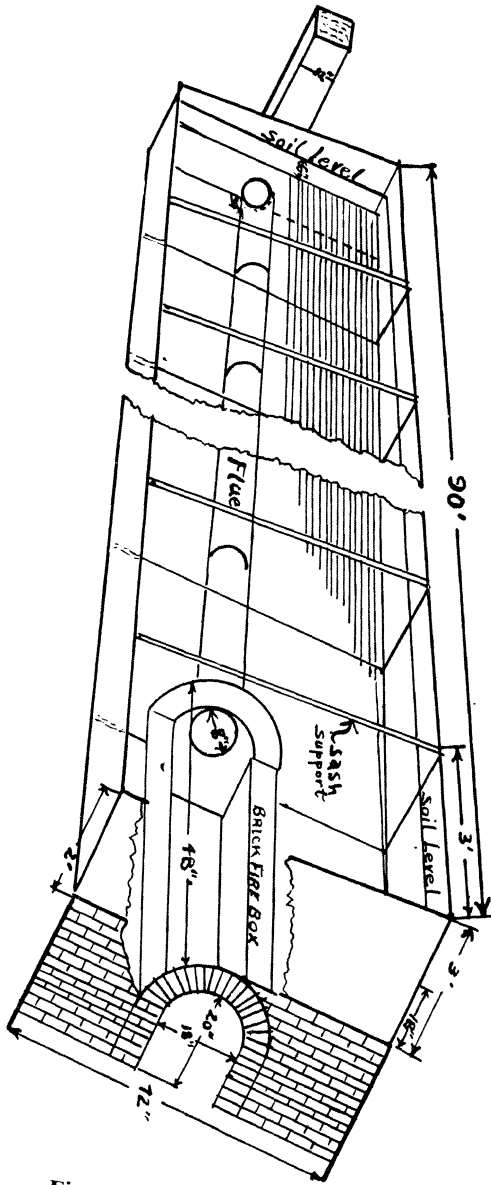


Fig. 2.—A Flue-Heated Hotbed.

box fashion. The chimney should be larger than the flue under the floor since this will make it draw better.

The wooden floor should be built at least four inches above the flue, so as not to catch fire and also to give better distribution of heat. The floor should have a slope of 1 inch to 7½ feet, or 12 inches to 90 feet. The soil at the furnace end should be 18 inches deep and at the chimney end 6 inches deep. The flue under the floor should have the same slope as the floor. The soil on top of the frame should be level. Any kind of rough boards may be used as flooring.

As shown in the drawing, the frame should slope toward the sun, and should be 6 inches higher on the back than on the front side. The top of the frame should be level from east to west.

### COLD FRAMES

The cold frame is constructed the same as the hotbed, except that the pit and manure are omitted. In other words, the cold frame has no bottom or artificial heat and is more frequently covered with cloth than the hotbed.

To prevent the cloth covering from sagging, supports 3 feet apart should be provided. The supports should extend from the ridgepole to the sides and flush with the upper edge of each.

**Uses.** The cold frame is used to winter over semi-hardy plants, such as cabbage, cauliflower, lettuce, and onions. Seed of these plants are

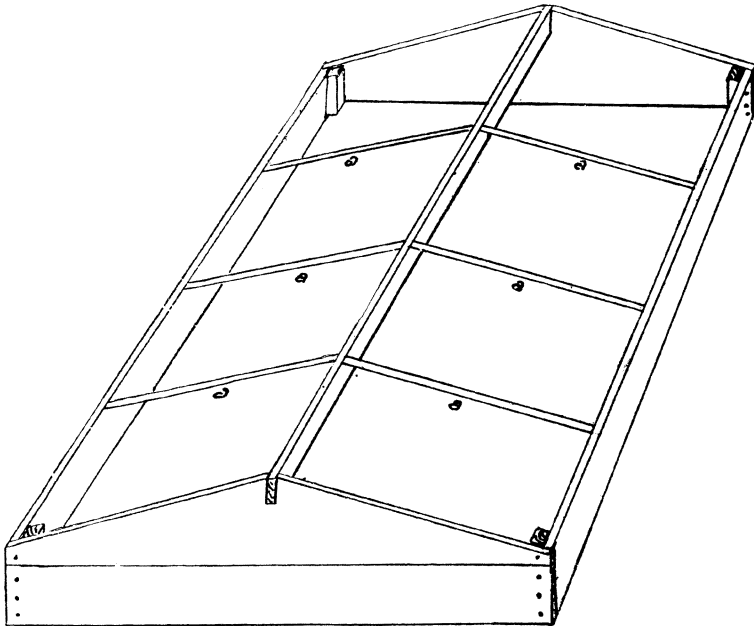


Fig. 3.—Double Cold Frame. (a) Supports.

planted in cold frames about the 10th of October and wintered over, thus producing what is commonly called frost-proof plants. In this location (Payne county) the above plants may be transplanted safely to the open ground from the 20th of February to March 10th.

Thus it is readily seen that the same frame used for the cold frame would be available for the family hotbed or frame garden. Cold frames are also used for hardening-off hotbed seedlings, as referred to previously.

When large, stocky cold frame tomato plants are desired, say 8 to 12 inches tall with a diameter the size of the finger, and with blossoms, the plants may be set in cold frames six to eight weeks previous to date of transplanting to the open ground. In this case the plants are usually transplanted 4 inches apart each way in the cold frame. Transplanting bands, in which to set the plants in the cold frame, are frequently used.

When a large amount of cold frame room is desired it is economical to construct a double cold frame, running north and south, thus facing the east and west. (See Fig. 3.)

**Location.** Small cold frames are usually located similarly to the hotbed. Long double cold frames are usually located near the planting ground. However, due consideration should be given the source of water and convenience of looking after the plants.

**Transplanting.** In transplanting plants from the hotbed or cold frame it is desirable to water them several hours prior to the time of transplanting in order to remove the plants without injuring or destroying the roots any more than necessary. Do not expose the roots to the wind or sun any more than is absolutely necessary. In replanting, make the hole large enough to receive the roots and then firm the soil well about them. As a rule, vegetable plants may be re-set deeper than they originally stood. In this way less of the plant is exposed to evaporation, and a deeper root system is established which will better enable the plant to stand dry weather.

If there is an excessive amount of foliage, a part of it should be removed at transplanting time. If watering is necessary, set the plants and partially fill the opening with soil and then firm it. Fill the remaining opening with water. Permit the water to soak in and then finish filling the opening with loose soil and leave it loose to afford a mulch.

**Plant Bearer.** When a large number of plants, such as tomatoes, with cubes of soil about the roots, are to be transplanted from the cold frame to the field, a plant bearer is handy.

A bearer can be made of two strong 2 x 2-inch pieces, 5 feet long, (smooth and round the ends of the pieces). Poles may be used instead of these pieces. The poles or pieces are called supports. Lay the supports two feet apart on the ground and nail barrel staves, concave side up, across them. Leave two-inch cracks between the staves. Sufficient staves may be used to come within 12 inches of the ends of the supports.

Place the plants on the bearer and then place the bearer in the wagon box. Several plant bearers may be placed in the bottom of the wagon box and bearers may be placed across the top of the sideboards. The plants may then be hauled to the field. With a person at either end of the bearer, and a third person to place the plants in the furrow, the soil about the roots will not be disturbed in the removal. Pull the soil in around the plants with a hoe and firm it with the feet. A plow can be used to finish filling the furrow.

