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### Garden Accessories and Mush- room Growing



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## COLDFRAMES

**T**HE coldframe is worthy of much wider consideration than it today enjoys. It is indispensable to the gardener; it is suited to the needs of the farmer, and it is a necessity to the flower lover.

The sash will always have its place in the economy of the gardener. It renders small services to many people, while the forcing house renders large services to a few people. The sash is everybody's helper.

A coldframe is merely a glass-covered garden. A coldframe has no bottom heat, or any heat, in fact, except that which it receives from the sun; otherwise it is like a hot-bed.

The sides are of board and the top is made of one or more movable sashes. An ordinary sash covers 18 square feet of ground space, being about 6x3 feet in its dimensions. The back of the frame should be higher than the front; a 12-inch back and 10-inch front may be used. Large sashes can be obtained, but the six-foot size is most convenient. The frame and sash can be home made, or the sash can be bought of the seedsman, and the frames made by a carpenter.

The coldframe is used in two principal ways: First, as a means of protecting plants from cold during the dormant period, and second, it affords sufficient protection for the growing plants late in the fall or in the early spring.

Many plants perish from the effects of frost. It is only the very hardy plants that can survive through a severe winter, even in the best protected coldframes. The ground

will freeze solid in the coldframes in winter but to a less depth than in the open garden.

The function of the coldframe is to ward off cold winds, to keep the ground clear of snow, and in spring and fall, to catch and retain the feeble heat of the slanting sunbeams and thus foster plant growth.

The coldframe can be used as a hotbed by packing fresh manure in the bottom of the frame to a depth of twelve or more inches, according to the time it is to be used and the degree of cold the plants are expected to stand.

Coldframes are ordinarily placed near the buildings, and the plants are transplanted into the field when settled weather comes. Sometimes the frames are made directly in the field where the plants are to remain, and the frames and not the plants are removed. This way eliminates the arduous task of transplanting.

Span-roof coldframes are very useful, as they allow of better and more uniform condition for the growing of plants.

Locate the frames on land that is well drained. They should have protection from north winds. The frames should always face the south; that is, they run east and west.

Protection must be given to the frames in severely cold weather; for this purpose mats and boards are used. The mats are most common. The cheapest mat is made of quilted burlap. Straw mats are more expensive, but can be handled easier and afford better protection than boards.

The back and front of the frames should be protected by banking up soil or manure to within about an inch or an inch and a half

of the top of the frame.

Some don'ts to be looked after in managing the coldframe work:

1. Don't neglect to water sufficiently.
2. Don't forget ventilation. This is important. The middle of the day is a good time.
3. Don't damage plant in transplanting. Get the plant used to its new home by degrees.

The soil of the bed must be of the right character, rich, easily worked, and well drained. Rotted sod is just the thing.

The coldframe is used for:

1. Growing plants early in the spring, as lettuce and radishes, and starting plants for transplanting, as celery, tomatoes, etc.
2. Growing some of the vegetables and flowers late in the fall, as lettuce, radishes, violets, etc.
3. Receiving plants which have been started earlier in hotbeds and forcing houses to harden them for outdoor planting.
4. Wintering hardy plants, such as cabbage and lettuce, and all plants which are grown in the fall.

Careful attention to details is the keynote to success in the use of coldframes or hotbeds.

RALPH R. JEFFRIES,

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## HOTBEDS

**T**HERE is usually one family at least in a community that has a hotbed. The crops of lettuce, radishes, and other vegetables, as well as flowers, which they are able to enjoy as late as Christmas

and in the early spring, are the enjoyment of all, yet this is often as far as it goes. The fact is, anyone that has a small piece of ground and can afford the expense of a small amount of glass and a few boards, can have a hotbed and run it successfully. Manure may usually be had for nothing.

The best location for a hotbed is on the south side of a building or of a tight board fence. The size of hotbed sash is commonly three by six feet.

After the size of the bed has been determined, a frame or box without top or bottom is made of just the right size to admit of using the sash for a cover. The sash should slant to the south, consequently the front of the box will be lower than the back. An eight-inch front and a twelve-inch back will be about right, though many other forms are used. A hole is now dug where the bed is to be, of the same size as the frame, to hold the manure which furnishes the heat. The depth of the hole will depend upon the degree of cold that it is expected the growing plants will stand. Zero weather will require 30 inches of manure, while for late fall or early spring usually a depth of twelve inches will suffice. If a twelve-inch layer of manure is decided upon, the excavation should be eighteen inches deep; the extra six inches to be filled in with soil in which to grow plants.

The manure should be collected a few days before seeds are to be planted or plants are to be set out. Fresh horse manure which is mixed with one-third of fine straw is commonly used. This is placed in a pile to ferment, which it will begin to do in a few days

if kept moist. When steam is given off, the pile is forked over, throwing the outside toward the center. After a few days the manure will become heated a second time, when it is ready to put in the bed.

In filling the beds put in a layer of manure at a time and press it down firmly with the feet. Care must be taken to see that each layer is spread evenly and packed thoroughly. The frame is now placed so that the bottom will be a little below the surface of the ground and covered with the sash until the bed is heated through. When this has been accomplished the surface of the manure should be made smooth, and the six inches of fine, loamy soil filled in. The bed should be allowed some more time to warm the soil, when it will be ready for seeds and plants. In the meantime the frame should be well banked on the outside with the same heating material.

Such a bed should give off heat for five or six weeks, if made in the early spring or late fall.

Covering of some kind must be provided for the beds and be put on before the sun gets too low in the afternoon, and then allowed to remain until 9 or 10 o'clock in the morning, depending upon the weather.

Great pains must also be taken with the watering and ventilating. Water only during the middle of the day so that the surface soil and the plants may have time to dry before dark. Otherwise the dreaded damping off of the plants may be induced. Ventilation is required for the same purpose. Moreover, there is a large amount of injurious gases given off from the manure which must be

allowed to escape. Even in the coldest weather ventilation should be provided, if only for a short time each day.

If such crops as lettuce, radishes, onions, and spinach are started in March, tomato and cabbage plants may be started after these crops are off. Plants for the garden may be grown in this way which are superior to those ordinarily found upon the market.

W. PADDOCK,

Horticulturist and Botanist, Agricultural Experiment Station.

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## **Sterilizing the Seed Bed for Tomatoes and Some Other Plants**

**L**AST fall, in the neighborhood of the Colorado Agricultural College, Fort Collins, there was a considerable scarcity of tomatoes. Growers complained that there was something the matter with their seed, or with their plants which failed to bear. Generally they attributed it to the season. However, while this complaint was being made, one grower was picking from one to two bushels daily from a small garden patch. This man knew the secret.

This is the time of year to provide for a crop of tomatoes. Upon heavy soils, and sometimes upon light ones, the *Fusarium* blight prevents the development of the fruit, or the fruit is of small size, poor in quality, and sometimes even shrivelled.

What is the *Fusarium* blight? It is caused by a fungus, a mould something like that which comes upon bread, old cheese, etc. It is found in the soil and apparently acts a little like the smut-fungus of onions.

It is known that if onions be planted in soil known to be free from this fungus, and are then transplanted to a soil where the disease has previously ravaged the crop, the young plants do not take it; whereas seed planted there results in smutty onions. Investigation has shown that the fungus enters the tip of the seedling, as it emerges from the seed; so if the seed-bed has no smut in it, the onion escapes. How the Fusarium blight enters the tomato plant is not known. But it is known that it enters it during its early stages. Then the fungus lives on for a long time, showing no evidences of its existence in the tomato plant. However, during this time it is sending a web of threads through the tissues of the plant, and by the time the fruit begins to form, there is such a mass of fungus threads in the vessels that the fruit can only form with difficulty, if at all.

No amount of treatment at this time can do any good. The fungus is established within the plant. However, if the soil in which the seeds are planted is sterilized, the disease does not get a footing, and the plants will develop their fruit naturally and freely. The best method of sterilizing the soil for the seed bed is to fill a barrel with the prepared soil and take it to the exhaust pipe of some steam boiler. The pipe, or an attachment from it, should be passed to the very bottom of the barrel, and the steam allowed to penetrate for two or more hours, gunny sacks being packed about the top to hold in the steam.

While it is believed that the disease is contracted at germination, it is desirable to take certain other precautions. No other soil



should be allowed to get into the sterilized bed or boxes. If the seedlings are pricked off young, they should be placed again in sterilized soil. Water that has been boiled and cooled should be used for watering during these early stages. No further precautions are necessary when it comes time to set these in the field.

For the home garden the soil may be sterilized by being spread out in shallow pans and baked in the oven. This is not so desirable as steam, since it does not leave the soil in such good condition.

Egg plants are also subject to *Fusarium* blight, and possibly also peppers, cabbage, cauliflower, broccoli, brussels sprouts, etc., which so easily "damp off" in the seedling stage, succeed better by being planted in sterile soil.

LESLIE F. PAULL

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## Mushroom Growing

**M**ANY letters are received at the Colorado Agricultural College each fall and winter, in which inquiries are made about the methods of growing mushrooms. One should know something of the nature and requirements of the plant before attempting to grow it. This is particularly true of mushrooms, since there are no other horticultural plants like them. Because of a lack of this knowledge many people fail, and this is not surprising, as they are regarded as the most exacting of plants.

Mushrooms belong to a vast family of plants which have no green coloring matter and produce neither flowers nor seeds. Lack-

ing the green coloring matter, they are unable to manufacture plant food, so must live upon that which has been prepared by higher plants. Thus we find them growing upon decaying wood and upon decomposed manure. Many of the kinds which are found in the wild are poisonous and none should be eaten without ascertaining for a certainty that they are edible.

But one kind is commonly grown artificially; this is known as "*agaricus campestris*." The seed-like organs, called spores, cannot ordinarily be used in propagation, but in their place the root-like parts are used. This material, called spawn, comes in the shape of bricks, which contain the underground portions of the plants in dormant form. Any seedsman can supply spawn.

Mushrooms do not require light in which to grow, consequently beds are frequently made in cellars. Any cellar or cave in which the temperature does not go much below 50 degrees may be used. An average of 55 degrees will be found to be about right.

A framework should be made for the beds of any convenient length and width, but deep enough to contain about twelve inches of compost after it has been well packed. Fresh horse manure that is nearly free from straw or litter is commonly used to grow mushrooms in, and it should be gathered as rapidly as possible. The manure is placed in a pile so as to induce fermentation, but it must be turned daily to prevent burning.

The heat will soon become intense, but after a few days it will subdue; after this stage has passed the manure may be placed in the

beds. It should be put in layers and each layer is packed as hard as possible by pounding with a brick or mallet. The temperature of the compact must be watched closely by inserting a thermometer into the bed. When it reaches 90 degrees the spawn should be planted. The bricks of dried spawns are broken into pieces about the size of a walnut and inserted into holes in the manure, about three inches deep and four or five inches apart. The surface should be pressed down firm after planting. In about ten days a coating of good loamy soil is put on the beds two inches thick; this should also be well firmed, then the beds are covered with hay or straw. If everything has been done just right, no further attention will be required until the mushrooms begin to appear. The air of the room must be kept damp, and if the beds become dry, moisture must be supplied. Water should be applied sparingly, however, and the less need there is for its application the better.

If everything goes right, which is doubtful, one may expect a crop in four weeks. We must not despair, however, if there are no results at the end of three months.

The limit of this article will permit of only the barest outline of mushroom culture, but it will serve to show that mushroom growing is something of a trade in itself. We would strongly advise all who contemplate growing this crop to send to the Department of Agriculture, at Washington, for their bulletins on this subject.

W. PADDOCK,

Horticulturist and Botanist, Agricultural Experiment Station.