INSTRUCTIONS FOR CONSTRUCTING A HOTBED AND FILLING IT WITH SOIL

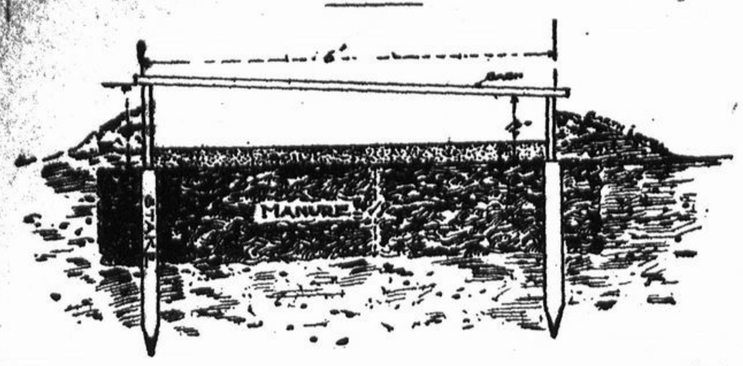


Diagram of Cross-Section of a hot bed made according to the method described.

By C. E. DURST,
University of Illinois.

A hotbed may be of any size to suit the convenience. The standard size of glass sash is 6x3 feet. 6x6 foot bed is often used. The standard size is 12x6, though 15x6 is much used. The larger the bed the more uniform the temperature will be.

The walls of the bed may be of board, bricks, or cement. Boards are the best and most practicable. Some persons recommend boarding the excavation to the bottom, but this is expensive and does not admit of extending the manure out further than the frame, which is a distinct advantage. A frame made of 12-inch lumber, used for the top part of the bed, is entirely sufficient.

The equipment for such a bed of the standard 12x6 size will consist of two 12-foot planks one foot wide for the north and south sides, two 6-foot boards one foot wide for the ends, four 6x3 double thickness glass sash, and about seven 12-foot boards one foot wide for covering. This equipment will cost from $12 to $15 and will, of course, last several years.

The first step in making such a bed, after the manure has been cleared away, is to put the parts of the frame together so they will fit the sash. Screws should be used rather than nails, for then the frames may be taken apart without injury and stored away conveniently when the beds are not in use. Cleats should be nailed both ends of each piece in order to prevent splitting.

Next is the excavation. It should be made larger than the frame in order that the sides of the bed will be warmed equally as well as the center. The depth will depend upon the kind of plant and on the drainage of the soil. For "warm season" crops, from one and a half to two feet of manure is required and for "cool season" crops about one foot. The deeper the bed is set in the ground the warmer it will be, but at the same time it will not be so well drained and may fill with water during wet seasons. Sometimes, in order to avoid this, beds are built entirely above ground, that is, the manure is simply placed on the surface and the frame set upon it. Such beds may suffer because of exposure. If conditions will permit, the best bed will usually result if the excavation is of such a depth that half or a little more of the frame protrudes above the level of the surface.

The bed should be set on some solid support rather than upon the manure. Stakes driven in the bottom of the bed to the proper depth are very good. The bed should be as nearly level as possible east and west, and have a pitch of six to eight inches to the south. Setting the frame square so the sash will fit evenly is important.

Horse manure is the only kind suitable for hotbeds. It should be fresh to begin with and have just enough short stray for bedding to make it hang to the fork well. It will be in a better condition for use if it is piled up a short while before needed and turned a few times. The best way to fill the pit is to begin banking the manure at one end, shaking it thoroughly to pieces as it drops from the fork and then packing it down well. Such treatment will prevent uneven sinking of the surface of the soil later. When the pit is filled the manure is tramped down with the feet. When packed down it should reach to about the lower edge of the frame.

The earth should be put in a few days before planting, at least, in order that it may become warm and mellow, and weed seeds in it sprouted. Four to six inches of soil is the proper amount. A soil made of four parts good garden or rotted sod soil, two parts compost and one part sand is a good mixture for plant growth. As mentioned, the bed should not be planted for a week or ten days after being made, so that the violent heat of the manure will have time to subside somewhat. In the meantime, it should be kept covered with the glass sash, and with extra cover at night, besides being banked around the outside with manure. The seeds should be planted in drills rather than broadcast.

WHAT TO PLANT IN THE NEW ORCHARD

By PROF. C. S. CRANDALL,
University of Illinois.

With the approach of spring men who contemplate planting fruit trees will be confronted with the question —what shall we plant? To experienced fruit growers the question is of no moment, their plans were made months ago. They know just what varieties they want and can give definite reasons for choosing those particular kinds. But to the beginners in commercial orcharding and especially to those city men who wish to establish fruit plantations on their newly acquired suburban places, the question often appears difficult.

There can be no better guide than local experiences; therefore it is suggested that those in doubt make investigations, each in his own neighborhood, and ascertain what fruits and what varieties of those fruits have been grown successfully in the immediate locality.

For those who plant with a view to the production of fruit for sale in commercial quantities, choice of varieties, within the list available for that region, should be governed by the demands of the market in which the product is to be sold. Markets have their preferences just as do individuals, and in every large market there exists a strong feeling in favor of only certain varieties that have an established standing in that market. Varieties not recognized as standard, no matter how high in quality or handsome in appearance, find slow sale in competition with those varieties to which the market has become accustomed.

A common error which beginners in commercial planting are most likely to make is that of planting too many varieties. A small number—say two or three of each kind of fruit—is better than a greater number, because large quantities of few varieties are more easily disposed of in a wholesale way than are smaller quantities of many varieties. This principle applies as well to small fruits, such as strawberries and raspberries, as it does to the various tree fruits. If, however, it is proposed to cater to a local market the number of varieties may be safely increased and they should be assorted in such manner as to give a succession through the season.

For the small plots, where the sole aim in planting is to supply the home table with fresh fruits, the selection of varieties, from among those known to do well in the region, may be based entirely upon the personal preferences of the members of the family. Quality and distinctive flavor should govern choice rather than size, attractive color or shipping firmness; the qualities essential in fruits destined for shipment to large markets. A succession of fruits through the season should be provided for, not forgetting apples that, when properly stored, will supply the table throughout the winter.

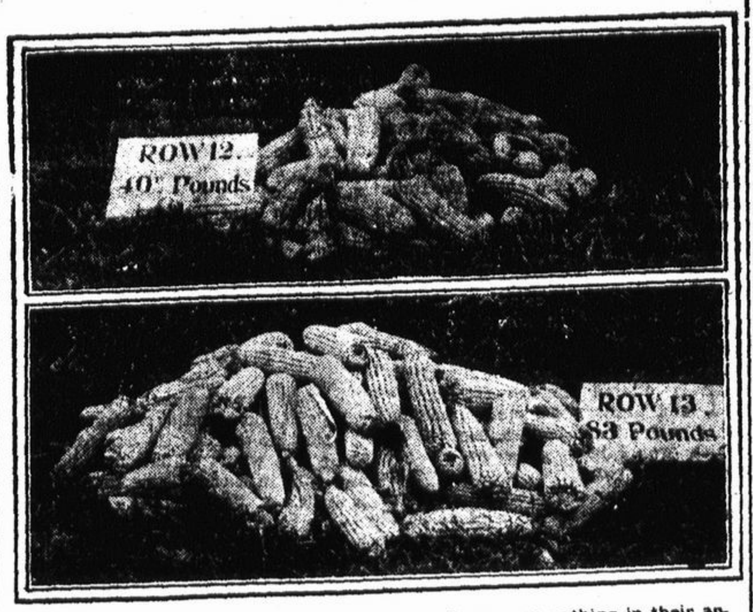
In choosing varieties for either commercial plantations or for the home place, the matter of inter-pollination should not be overlooked. Specific information regarding the best possible association of varieties is deficient, that is to say, definite experiments have not yet gone far enough to admit exact statements as to the varieties best adapted for association with certain other varieties. However, enough is known to warrant the statement that some varieties are wholly self-sterile and when planted alone, produce no fruit; others are in part self-sterile and need close association with kindred varieties in order to be fully productive; still others are perfectly self-fertile and consequently productive when isolated.

But even with those self-fertile varieties, it has been demonstrated that association, sufficiently close to insure free interchange of pollen with other varieties, tends to increase the fruit in size and quantity.

Certain varieties of strawberries have pistillate flowers and can produce no fruit unless planted near a variety having perfect flowers that can supply pollen for fertilization. The wild goose plum is self-sterile and when planted alone is wholly unproductive; associated with other varieties of plums it produces abundant fruit. Bartlett, Lawrence, Winter Nelis and many other varieties of pears are commonly self-sterile, while Angouleme (commonly known as Duchess), Keiffer and Seckel are self-fertile. By mixing the varieties, not only do the self-sterile become productive, but the self-fertile show increased productiveness. With apples, large blocks of single varieties are notably less productive than are blocks of mixed varieties.

Fruit trees are planted to occupy the ground for long periods; they do not give immediate returns and must be well and constantly cared for. Mistakes in location, in choice of kinds and in management are not easy to correct. Therefore it is wise not to plant hastily, but only after due consideration of all factors that appear to have bearing upon the ultimate success of the project.

IMPORTANCE OF THE CORN BREEDING PLOT FOR TESTING THE SEED EARS



The products of two different seed ears. There was nothing in their appearance to predict this difference in productiveness.

BY LOUIE H. SMITH,
Professor of Plant Breeding, University of Illinois.

The only way to determine whether a seed ear will produce is to test it. Herein lies the importance of the breeding plot where all the seed ears are subjected to a performance test as regards their yielding capacity, and only those are chosen for further propagation that actually prove themselves to be the most productive.

As showing the effectiveness of the breeding plot, an increase of 9.5 bushels of corn per acre was obtained as the result of four years of breeding at the Nebraska experiment station, where seed from the breeding plot was compared with that produced from the same original stock but not bred.

The question then arises, shall every farmer become a corn breeder for the sake of this improvement? Not necessarily so, any more than that every farmer should become a breeder of pedigreed live stock. But although every farmer may not be a corn breeder himself, he should be vitally interested in the matter. Some individual, however, in every community ought to have this interest especially at heart and ought to be conducting a breeding plot for the improvement of corn for his locality for the benefit of himself and his neighbors, and in this enterprise he ought to have the support in the way of interest and sympathy, if not the patronage of every progressive farmer in that community.

While the best results are to be expected from the use of the systematic breeding plot, there is much improvement to be gained in good field selection as compared with the ordinary way of picking the seed corn out of the crib. In the selection of seed corn much importance has been attached to the appearance of the ear and too little consideration given to the plant that bears the ear. It should be remembered that the characters of the plant are just as certainly transmitted through the seed as are those of the ear. On this account seed corn should be selected in the field from the standing plants, and early enough so that the conditions of maturity can be taken into account. This method makes it possible also to take into consideration certain desirable characteristics of the plant, such as size of stalk, height at which the ear is borne, position of the ear, whether upright or drooping, and, what is of great importance, something of the environment under which the plant is produced. Other things being equal, only plants growing in a full stand should be chosen.

In a carefully conducted test comparing the productiveness of seed selected in this way from the plant, with that selected from the crib, the Ohio experiment station made an increase of 3.25 bushels per acre, this being the result of a single year in which no continued breeding is involved.

FEEDING VALUE OF SOME FARM CROPS

By PROF. W. J. FRASER,
Dairy Department, University of Illinois.

The object of the dairy farmer, so far as the crop side of his work is concerned, should be to raise those crops that will produce the largest number of pounds of digestible nutrients per acre and at the same time make a palatable and well balanced ration for dairy cows. Most farmers give little thought to this real economic basis for determining which crops should be raised.

This cow produced an average of 33 pounds of milk per day for three months and 7,434 pounds of milk and 259 pounds of butter fat in one year. The following lactation period she produced an average of 43 pounds of milk per day for three months. Her feed consisted of corn silage and alfalfa hay, no grain being fed during the 15 months these records were made. She had received no grain for over a year when this photo was taken.

On good, well drained land, corn and alfalfa will produce from two to four times as much digestible nutrients per acre as any of the other crops commonly raised on the farm and, in addition to this, are palatable and well adapted to the feeding of dairy cows. It is not necessary to encourage farmers of the central west to grow corn, as this is already grown extensively, but the serious difficulty with most dairymen is that they usually grow timothy hay, millet, or some crop of that kind to supplement the corn. The result is that the corn, already high in carbohydrates, when supplemented with such a crop as timothy hay necessitates the feeding and nearly always the purchase of large amounts of high-priced feed rich in protein to balance the ration.

Alfalfa produces over ten times as much digestible protein per acre as does timothy and has still another value of being much more palatable and keeping the cow's system in better physical condition.

A yield of four tons of alfalfa hay will furnish 4,400 pounds of digestible nutrients containing 480 pounds of digestible protein per acre; this is as much as is contained in an equal weight of bran. If every acre of alfalfa will save the purchase of four tons of bran or an equal amount of similar feed, is not the growing of this crop worth considering? An acre of good corn will furnish 40 pounds of silage for a cow per day for 500 days, and an acre of alfalfa will furnish 16 pounds of hay for a cow per day for 500 days. This makes a good ration for a cow producing 22 pounds of milk per day or 7,000 pounds per year. This means that an acre of corn put into the silo and an acre of alfalfa made into hay will support a cow 500 days, or it will require only 1.37 acres of land to support a cow a year on a ration composed of these crops, while 1.37 acres of blue grass pasture will support the same cow only 78 days, or about one-fifth as long. This would indicate that on high-priced tillable land where it is desired to practice intensive methods, corn and alfalfa should be largely grown and that pasture acreage should be reduced to a minimum.

To show the great value and economy of corn silage and alfalfa as feed for dairy cows the department of dairy husbandry fed twelve grade cows on a ration composed entirely of these feeds for periods varying from eighteen months to over two years, no grain being fed during this time. The silage was made from fairly heavily eared corn.

The twelve cows averaged 8,259 pounds of milk and 290 pounds butter fat for the year. The large production of these cows for so long a time and their fine sleek condition speak wonders for the economy and efficiency of these feeds for dairy cows.

This cow produced an average of over 33 pounds of milk per day for three months. She produced in one year 8,523 pounds of milk and 264 pounds of butter fat. The following lactation period she produced an average of 35 pounds of milk per day for three months. Her feed consisted of corn silage and alfalfa hay, no grain being fed during the 17 months these records were made. She had received no grain for over a year when this photo was taken.

The accompanying cuts show the condition of two of these grade cows after receiving no grain for over a year, the records having been made during that period.