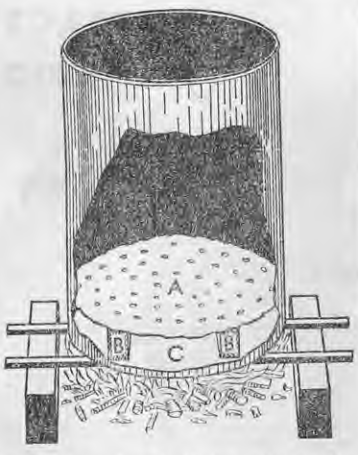
may be soil or water borne, carried over in seed boxes or spread by tools, or transmitted by insect pests. Recent experimental work has shown that one of these diseases, foot rot of tomatoes (*Phytopthora cryptogea* Pethybr. and Laff.), commonly causing serious loss in seedlings can be controlled by use of a proprietary brand of copper oxychloride at 1 or 2 per cent., and that the more commonly used fungicidal substances, formalin at 0.25 per cent. (1 : 400) and Cheshunt compound at 1 per cent. also gave satisfactory control without injury to seedlings. It is likely therefore that any of the above materials at the strengths given would be effective in the control of most of the other minor fungous diseases which attack seedlings. Several other fungicidal substances tested by the research workers gave control but damaged the seedlings.

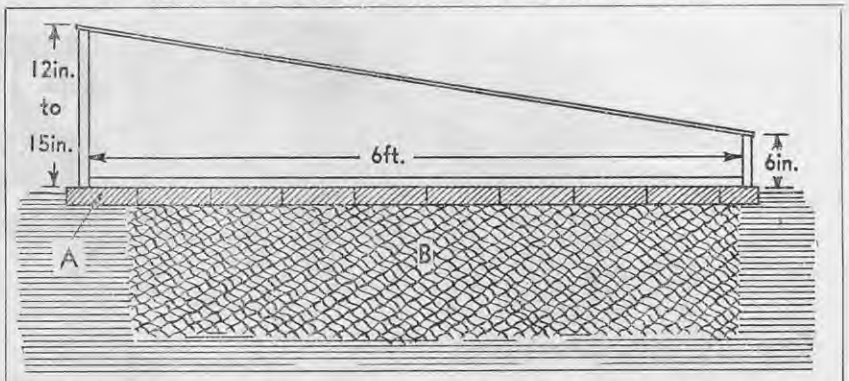
Soil Sterilisation

Most garden soils that have been cropped consistently for some years contain many disease organisms harmful to seedlings and for that reason it is advisable to disinfect or partly sterilise such soils when they are used for raising seedlings. This can be done with steam or chemicals. Small quantities can be steamed in a sack suspended over a little water in a wash boiler with the lid on, or in the open by using a drum such as a 5-gallon oil drum. The oil drum should have the top cut out and then be burnt out to remove the oil. Two half bricks or blocks of wood should then be put in the bottom and covered with water and the cut-out top dropped on them. The drum should then be filled above the dropped-in top with loose soil and placed over a fire. When the soil at the top of the drum is much too hot for the hand most harmful disease organisms should be destroyed, but to be on the safe side it is usually best to maintain the fire for a further 10 minutes before removing the soil.

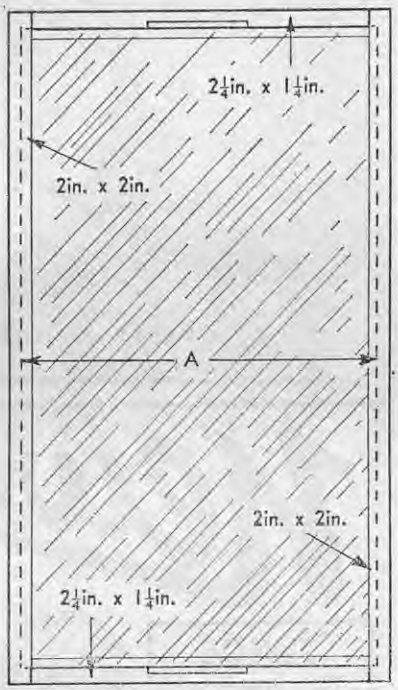
Alternatively the soil can be treated with formalin or chloropicrin. Formalin is used at 1 gallon to 49 gallons of water, and 50 gallons of the mixture should be sufficient to treat about 1¼ tons of soil. The soil, which should be free from lumps, should be spread in a layer 6in. deep, watered with the solution, and either covered with wet sacks or with another layer of the soil to be treated. When the heap is high enough, usually 2 to 3ft., it should be sprayed with water, covered with wet sacking, and left for 2 to 4 weeks, after which it should be turned to dissipate the fumes. As formalin will damage plants, the fumes must be completely dissipated before the soil is used. Treated soil should be dug over a number of times (fine, loose soil less frequently than heavier soils) until all trace of formalin smell has gone. This may take as long as 6 weeks.



A container for sterilising soil can be made from a 5-gallon drum. The top should be covered with a lid or wet sacking to retain heat and prevent loss of too much steam. A—Cut-out top of drum, in which small holes are punched to facilitate entry of steam into soil. B—Bricks. C—Water. Soil is placed on A.



Frame heated by fermentation of horse manure or garden refuse. A—Bricks on which wooden frame rests. B—Fermenting matter.



Dutch light. A—Glass 32in. x 58in. and not lighter than 21oz.

Chloropicrin, a tear gas, can be used, but owing to the risk of irritation to the hands, eyes, or lungs or more serious effects, it is not recommended to home gardeners. Experience in handling, the use of a suitable gun for injecting, and a good gas mask are essential for safe use.

Methods of Heating Frames

Well-built frames in favourable sites should, under proper management, retain sufficient heat overnight to ensure that night and day temperature variations are not great, but in frosty weather it is usually necessary to close frames in the afternoon before the direct sun heat is gone, and in the colder districts that is usually at least an hour before sundown. In addition where very heavy frosts are expected the glass should be covered with sacking or scrim.

Animal Manures or Refuse

Where there is insufficient sun heat for good growth it may be necessary to provide artificial heat. One of the simplest and cheapest ways is to put in the bottom of the frame a layer of material such as horse, fowl, pig, or other animal manure, spent hops, or rubbish which will create heat while decomposing, such as that used to make compost. Horse manure, provided it does not contain too much straw, is one of the best materials, as its behaviour is more predictable than that of most of the other substances. It should be moist without being wet and should be turned at least twice at intervals of about 3 or 4 days to ensure that bacterial action throughout is uniform. It can then be placed in the frame, where it should be firmed gently. If it is beaten down with the back of the fork used to turn it, consolidation should be adequate.

If garden trash and similar mixed materials are used, the general principles governing the making of a compost heap should be followed. Soft, green, nitrogenous materials or animal manure without too much litter should be mixed or layered with wet, fibrous material. A sprinkling of lime should be added every few inches, as bacterial activity will be greatly reduced if conditions are too acid. Moisture is essential, but the heap should not become too wet, particularly if of material which readily becomes soggy. Excessive firming of material which tends to consolidate should be avoided and additional ventilation should be given by making holes with the handle of a rake or similar tool about 10 to 15in. apart down into the heap.

The depth of the layer of fermentable material placed in a frame