depends on its composition. Readily fermentable material such as horse manure or spent hops need be only about 6in. deep, though deeper beds usually retain heat longer. Garden trash should be at least 24in. deep and properly layered.

A layer of soil should be put on top of the fermentable material. It need be only 1in. deep if the plants are to be grown in boxes, but if plants are to be grown in the soil of the frame, it should be deep enough for root action and should not dry out or be overheated; 6in. is usually about the best depth.

Fuel Heaters or Electricity

As an alternative to heating by fermentation frames can be heated by oil- or kerosene-burning heaters or by low-tension electric cables. There are a number of heaters on the market which are capable of heating frames or small glasshouses. The number of cubic feet of air space a heater is capable of heating is usually given by the maker or if the output in British thermal units is known, the space it is capable of heating can be determined.

The larger heaters should be fitted with a chimney or flue to allow fumes to escape, and care is necessary, particularly where there is no escape pipe or flue, to ensure that combustion is complete, as fumes, particularly those of partly volatised oils, can be very damaging to the foliage of plants such as tomatoes.

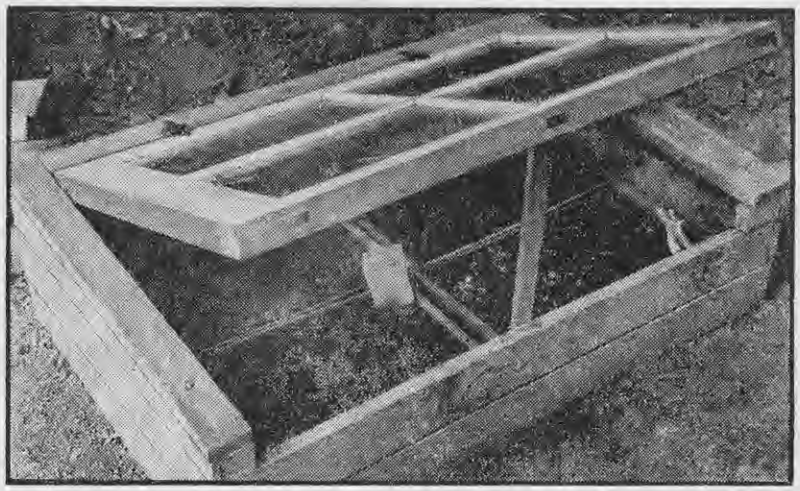
Choice of a heating system should be governed by the lowest outside temperatures likely to be experienced, the inside temperatures needed, the loss of heat through a glazed structure (which is much greater than that of a structure of wood, brick, or similar material), and the heat output of the heating unit.

For heating by low-tension electric cables a transformer is necessary for the reduction of the voltage from 230 to 12 and the heat is applied through a galvanised-iron wire circuit, which is usually placed from about 1 to 6in. deep in the soil. If plants are grown in boxes placed on the soil, 1in. of soil may be sufficient, but if they are grown in the soil, they need a much deeper root range; 6in. has been found satisfactory for a great range of plants propagated in electrically heated beds, though slightly shallower soil is satisfactory for some subjects if watering is done carefully and the heat is kept low.

A soil thermostat should be installed through the side of the frame about 1½in. above the level of the wire and the soil can thus be maintained at the desired temperature, which is about 60 to 65 degrees F. for most propagating work. The area of the soil to be warmed will determine the capacity of the transformer required and the gauge and length of the wire circuit. When warming is thermostatically controlled about 6 watts to each square foot of soil is sufficient.

The amount of power used by a small unit is small and owing to the low voltage used there is no danger to the operator, but because of restrictions on electricity, permission to install may not readily be granted by electrical authorities.

For those interested, fuller details of electrical soil heating may be obtained from the Storage Specialist, Department of Agriculture, Wellington.



[*R. W. Orr*

A window sash is useful as a frame top, but as it does not shed water, the woodwork is likely to rot fairly quickly.

Preservative Treatment of Timber

Durable timber is rarely available for seed boxes or frames and to extend the life of the wood used in construction it is advisable to apply some form of preservative. Oil-soluble wood preservatives such as zinc naphthenate (2 per cent. metal by weight), copper naphthenate (1 per cent. metal by weight), and 5 per cent. pentachlorphenol are available as proprietary lines and, applied with simple brush treatments, are effective in prolonging the life of wood used in the garden. The degree of protection is governed largely by absorptions and penetrations; 20-minute dip or soak treatments are superior to brush treatments.

Timber should be seasoned and fully manufactured, as dressing or cutting subsequent to treating may expose untreated surfaces. In addition treatments of aqueous solutions of Wolman salts, which give complete penetration, are available from some timber merchants. The timber should be painted afterward if long-lasting protection is required, or there may be some loss in effectiveness owing to leaching.

Coal-tar creosote is an effective wood preservative, but may damage plants, as, under certain circumstances, treated wood may give off damaging fumes for many months.

A type of frame not often seen. Built like a miniature glasshouse, it has some advantages of a glasshouse together with those of a frame. It can be heated readily with a kerosene- or oil-burning heater.

Work for August

In most districts August is regarded as the first month of the new gardening year, but there should still be no urgency to sow or plant extensively. Operations should be governed by the state of the soil and the weather. Green crops should be dug under, as a heavy green crop takes some time to rot down after being turned in. The value of lupins as a green crop has long been recognised, but to obtain full benefit from them digging in should not begin until there is considerable development of nodules on the roots.