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COLLECTION SMALL GREENHOUSES FOR AMATEUR GARDENERS

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SMALL GREENHOUSES FOR AMATEUR GARDENERS

by

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Requests are frequently received by the Department of Horticulture for information concerning small greenhouses for private homes. Many of the inquirers are unacquainted with greenhouse types, dimensions, materials, and the construction and heating of such a house.

This publication discusses briefly the characters of greenhouses suitable for the average non-commercial gardener.

Types of Greenhouses

For the amateur grower, greenhouses may be divided into two kinds (1) lean-to, (2) even-span.

The lean-to house is built alongside an existing building such as a house or a garage. It is virtually equivalent in width to one half of the standard greenhouse. Lean-to houses are useful in providing greenhouse space for amateur gardeners. They are relatively inexpensive but have some disadvantages in (1) limitation of space and (2) limitation of light on account of the solid back wall. However, a lean-to house may be a most useful plant workshop and may often be heated from the central heating unit of the residence.

The standard greenhouse is an even-span type with a similar length of roof span on either side of the greenhouse. It is capable of providing twice as much space as the lean-to house and affords the maximum amount of light.

Location

The small greenhouse is not infrequently connected with the house; otherwise it is set to one side in a separate location near by.

The efficiency of the greenhouse in producing plants should not be impaired by shaded buildings and trees. However, a windbreak is useful in protecting the house from cold winds provided it does not cast undue shade.

Dimensions of Small Greenhouses

Lean-to greenhouses are commonly 7 to 10 feet wide or one-half the width of the standard greenhouse. The length of such a house will vary according to the building with which it is connected. Lean-to greenhouses commonly have lengths of 10 to 20 feet or more. The height of such houses is usually 6 to 7 feet at the eave line and 10 feet or so at the back line. The lean-to should be placed on the south or east side of the house.

Even-span houses vary in width from 10 to 30 feet. Standard widths usually run at about 10 feet 6 inches, 14 feet, 17 feet, 21 feet, 25 feet and over.

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A 17-foot house is a popular size for a small house and the cheapest to build considering square foot cost. With 6 feet at the eaves, such a house has a height at the ridge or center of approximately 10 feet. (See Extension Circular 418, Greenhouse Management.)

General Construction and Materials

Sidewall Construction. The height of the eaves of the average small greenhouse is 6 to 7 feet above the ground level. The wall consists of (1) concrete footings, usually 2 feet below ground level, for pipe posts, (2) 6-inch footing wall, (3) concrete wall of approximately 32-34 inches above ground level, (4) sill, (5) side glazing bars with two rows of 16 by 18-inch glass above the concrete, (6) eave plate and gutter. An alternate sidewall construction would be to have sheathing above a 6-inch concrete footing wall and the usual two rows of glass. If moles might be troublesome the footing wall would be 18 inches below ground level. In some houses the eave height may be raised a foot or so, possibly 7 feet, in which case shelving may be utilized on the wall to good advantage to hold flats of plants and the added height of the greenhouse wall will be of value in growing crops needing considerable headroom such as sweet peas, tomatoes, chrysanthemums, etc.

Pipe posts, usually 1½-inch standard pipe, are set in concrete piers to grade before form or wall work is started. Other posts are set in concrete the form work is built around the set posts. It is possible also to set posts in the wall when pouring concrete. These posts extend to the eave line and strengthen the side wall construction. Such posts are usually spaced about every 8½ feet or so, with not more than six rows of glass between sections or bays. Standard sash bars and glass are used in the side wall. Sometimes it is desirable to have ventilation provided in the side wall, especially in small houses.

Roof Construction. This consists of sash bars (roof bars), glass, purlins, roof columns, struts, or tie rods and ventilators.

The standard sash bars used in roof, sides and ends of a greenhouse for holding the glass are commonly 1 3/8-inch by 2¼-inch. The bar, which is preferably of cedar, has a drip groove toward the lower part of the bar, as shown in the illustration (Fig. V), to carry off water of condensation thus preventing drip from the roof on to the plants.

Glass is preferably 16 x 18 inches, laid the 16-inch way between the sash bars. It is imbedded in putty as the sides of the glass lie on the edges of the bars. The glass should not be lapped more than one-quarter of an inch (Fig. VI). It is held firmly to the sash bar by standard glazing nails that have a flat side as they lie on the glass. Good putty of whiting and linseed oil is necessary for proper glazing.

End Construction. This consists of standard bar and glass with regulation door at one end or entrance may be made from the work room attached to one end of the greenhouse.

Purlins are roof supports running lengthwise the interior of the greenhouse under the sash bars. (Fig. III.) In the small greenhouse 1-inch pipe, or angle iron, is commonly used for purlins, and each roof bar is firmly held to the purlin by a metal clasp or pipe strap.

Roof columns are vertical pipe posts supporting the roof. In smaller widths of greenhouses one central column under the ridge or center of the house is used, being commonly of $1\frac{1}{4}$ -inch pipe. (Fig. III.)

Struts are short pieces of pipe extending from the central roof column to the purlin on each side of the roof. (Fig. III.) Struts are usually pieces of $\frac{3}{4}$ - or 1-inch pipe.

Tie rods are used where the width of the greenhouse demands more than one line of upright roof columns. They are connected with the roof columns and to the purlins.

Ventilators are placed on one side or both sides of the roof, depending on the size of the house. Houses of small width have a vent on at least one side. Wider houses are ventilated on two sides. Ventilators are made up separately from the roof proper and are hinged at the ridge or center of the house. In some cases it is desirable to have a portion, at least, of the side wall construction arranged for side ventilation.

Good paint is essential in protecting the wood parts and joints thoroughly, especially where sash bars join sash plates and also at the putty seam.

Interior Arrangement

Benches. Narrow greenhouses have two benches and a central walk. In a lean-to greenhouse of 8 feet wide or so, there would be two benches of 3 feet and a walk of 2 feet. In an even-span house of 10 feet or so, there would be two benches of between 3 and 4 feet, with a walk of 2 or $2\frac{1}{2}$ feet. In a wider even-span house, two side benches and a central bench are provided with two walks. The width of walks commonly varies between 2 and $2\frac{1}{2}$ feet. Benches are made at a usual height of 32 to 36 inches to the top of the bench.

If benches are constructed with pipe legs and cross pieces instead of wood, bench repair is reduced to a matter of replacing side and bottom boards only.

The depth of benches varies from 6 to 8 inches, although some benches are quite shallow which carry plants in pots instead of plants growing in the bench soil.

Right angle iron braces should be used inside the bench to keep the side boards in position and also pieces of angle iron are sometimes put over the top edges of the side boards where the edge of one board meets the other.

Shelf Brackets. Additional space in the small greenhouse may be provided by putting up brackets attached to side wall or center posts on which boards can be placed for holding flats of plants. These should be placed well above the plants growing on the bench below.

Heating the Small Greenhouse

The amount of artificial heat that will be necessary to be provided will depend on the area in the State and what temperatures commonly prevail during the late fall and winter months.

Most greenhouse plants grow satisfactorily in a day temperature of 65 to 70°, and a night temperature of 15° or so lower than the day temperature. 55° F - 60° F is a common night temperature where a variety of plants is being grown.

Heating systems will also depend to a great extent on the size of the greenhouse. Some very small houses may be heated with a stove and pipe located in a workroom adjacent to the greenhouse. Other houses may be heated with a hot water system carried from the residence heating unit to the greenhouse. In many cases there will be a separate hot water system with one of various kinds of fuels used for heating the water, depending on the availability and the economy of the fuel.

Heating requirements of a small greenhouse such as the amount of pipe installed for carrying hot water for radiation are based on two temperatures:

(1) the normal lowest temperature of the winter and (2) the temperature desired to be maintained in the greenhouse during such weather. Thus, if the temperatures were 10 to 15°F. above zero outside and 50 to 55°F. inside the greenhouse, heating requirements could be readily figured according to the dimensions of the greenhouse.

For example, a greenhouse 14 feet by 25 feet of usual construction and carrying a temperature of 55°F. inside with an outside temperature of 20°F. would require approximately 108 square feet of radiation, or about 250 lineal feet of 1¼-inch pipe.

For a small hot water circulation system, 1¼-inch pipe will give satisfaction for carrying the water. These pipes are usually placed in horizontal groups under the benches or vertically on the side wall.

Fuel for heating water might include sawdust, wood, electricity, oil, or gas, depending on the economy of materials. Some houses are heated with a small sawdust burner. Others have an automatic oil or electrical unit. A wood-banked fire may fill the bill for some houses of small size.

For providing special soil heat, an electric cable may be used in the greenhouse bench for propagation purposes. With thermostatic control, the soil can be maintained at the desired temperature for rooting of cuttings, seed germination, etc. (See Oregon Experiment Station Bulletin 307 - Electric Hotbeds and Propagating Beds.)

Workroom

This is a desirable, if not an essential, part of a small greenhouse. Such a room provides a place for (1) various plant growing operations such as soil mixing, seeding, transplanting, potting, etc.; (2) storage for soil ingredients and general supplies; (3) the heating unit. If the greenhouse runs north and south, the workroom should preferably be at the north end.

Cold Frames

A few cold frames are necessary in conjunction with greenhouse operations. They help to relieve the congestion of plants in the greenhouse and provide a place in which plants may be hardened to some extent before being put into the garden. The construction and operation of a cold frame is discussed in Extension Circular No. 258.

Greenhouse Management

Various operations in the management of a greenhouse are discussed in Extension Circular 418, obtainable at the office of the county agent or from the Extension Service, Oregon State College.

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Even-span Greenhouses of Varying Widths

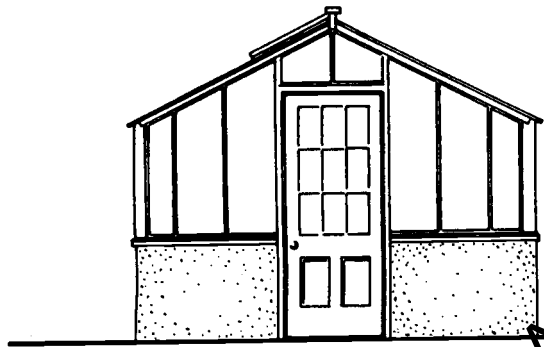
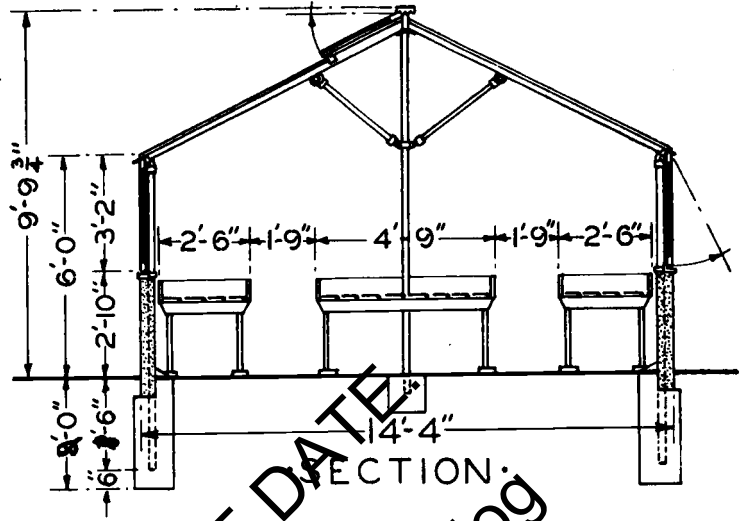
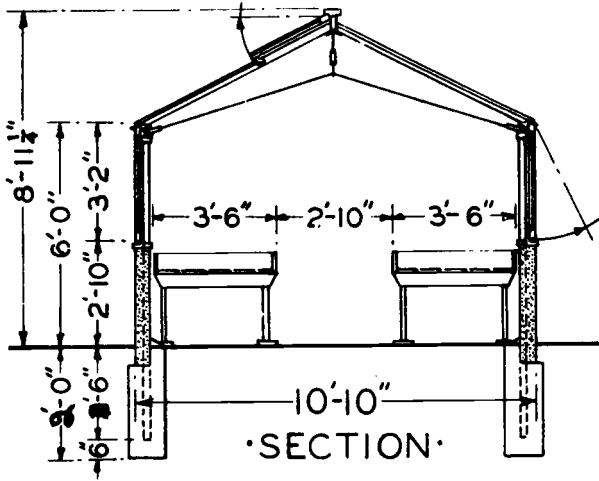


Fig. I

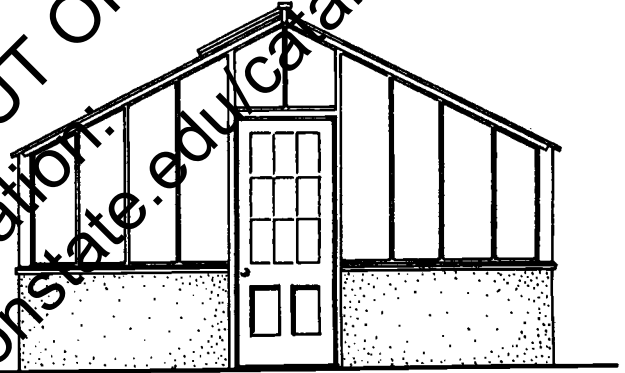


Fig. II

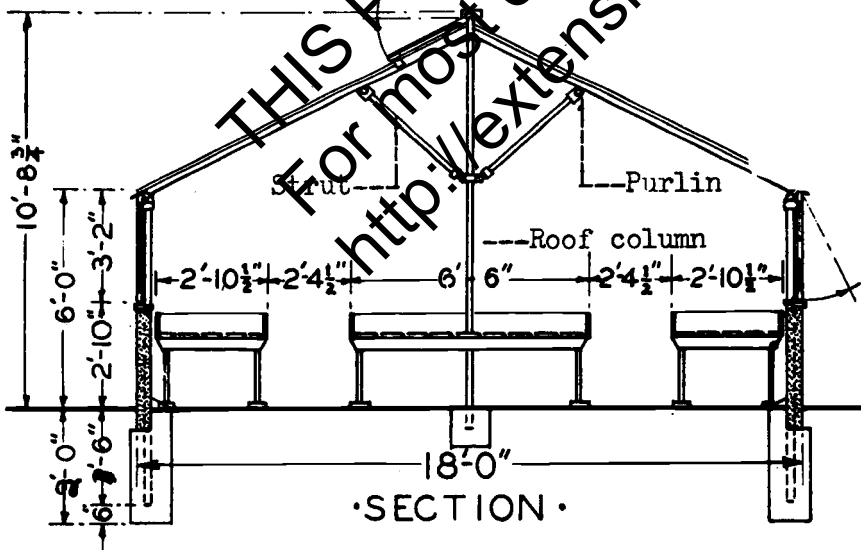


Fig. III

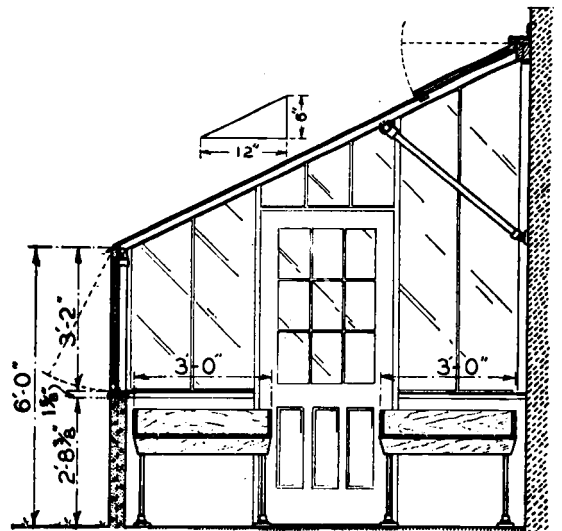


Fig. IV

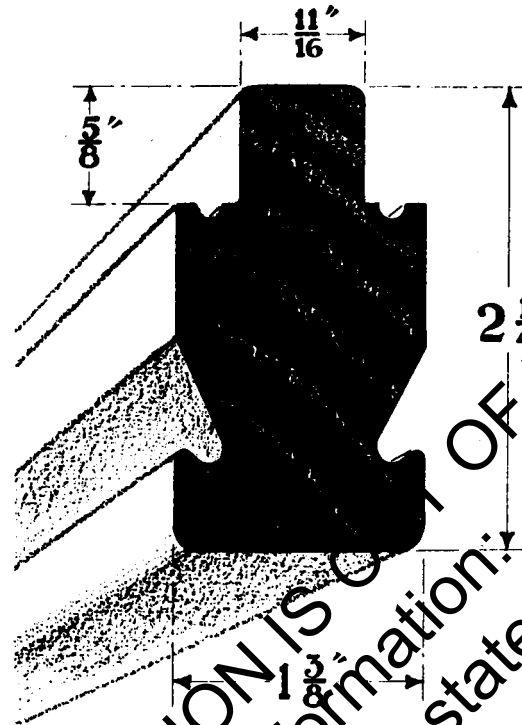


Fig. V

Standard Sash Bar

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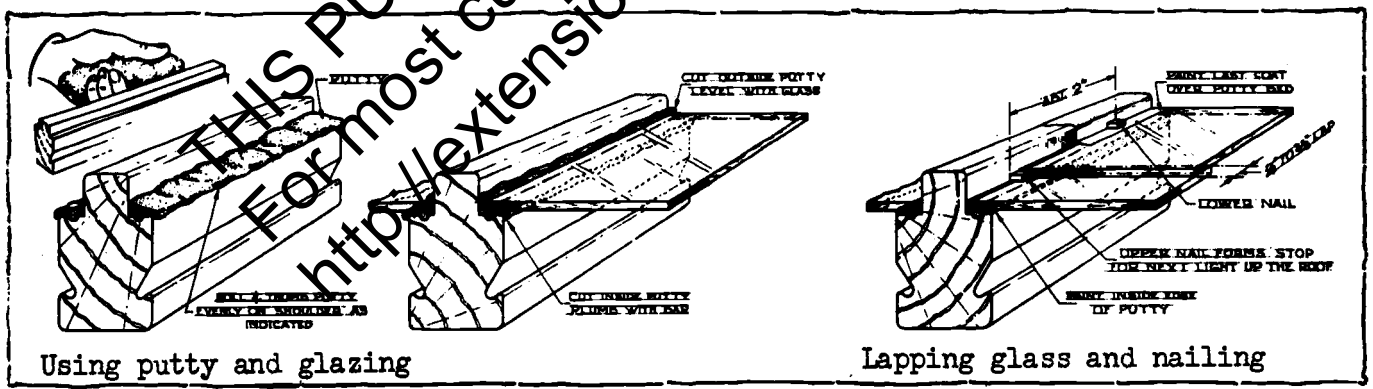


Fig. VI