Brothers Build Their Own Growing-Room*

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Today at Duncalf Farm, Hale, near Altrincham, Cheshire, Brian and Derek Walker are replacing and extending the old glass with nearly two acres of aluminum houses consisting of six blocks 170 ft. x 80 ft. They have also 20 acres of outside cropping area.

A central boilerhouse provides direct steam heating for half of the glass area and steam-injected high speed hot water heats the other half. They employ three men and four women, specialising in outdoor cropping of cauliflowers with lettuce and tomatoes under glass.

For tomato propagation they are using a growth room.

On a specification provided by Mr. C. W. Gould of the North Western Electricity Board the Walker Brothers have constructed their growing room in an existing packing shed. One side and one end of the outer shell is formed by the existing building the other side and entrance being constructed of hardboard and a cladding of sheet steel on a 1 in. 10 swg R.H.S. framework.

Inner Shell

The inner shell is built of hardboard at each end and perforated (peg-board) sides behind the benches from floor to ceiling. Peg-board sides are spaced away from the outer shell to form a plenum chamber or air duct on each side of the room. The solid board ceiling contains a trap door giving access to the roof space which forms the fan and heating chamber.

This chamber is divided, parallel to the longer axes of the benches, by a wooden partition on which are mounted two 18 in. 0.5 H.P. propellor fans each rated out 2600 c.f.m. at 0.5 in. S.W.G.

These fans force air into one wall plenum, through the holes in the peg-board across the benches and return it via the opposite peg-board plenum. The essential adequate air movement is provided by the fans to equalise the temperatures within the room and they run continuously regardless of the temperature.

Heat to Spare

As each 8 ft. 125 watt fluorescent tube emits about 100 watts of direct heat and 96 tubes are used in the installation and produce about 9kW's of heat, very little supplementary heat is required and quite often to maintain an air temperature of 70° deg. F. excess heat must be dispelled.

This is done by means of an automatically operated ventilation vane which allows unwanted heat to be blown to atmosphere and replaced by cooler air. The ventilation vane is operated by a Honeywell Modutrol motor controlled by a Honeywell air thermostat located in the room.

Should the desired temperature drop when the lighting is not in use supplementary heating is provided by a heat exchanger which is mounted in front of each fan and the steam is controlled by a Honeywell valve operated by an air thermostat in the room.

Six benches are incorporated in the room each bench being 4 ft. wide and 9 ft. in length and each layer of benches about 2 ft. 6 in. apart. The benches are constructed of ½ in. Weyroc board supported by 1 in. x 1 in. 10 s.w.g. R.H.S. with 4 in. x 1 in. edging boards forming a tray which is lined with 1,000 gauge black polythene sheet containing a 3 in. layer of 1/16 in. crushed gravel.

Feed Tanks

Mounted outside the room are small plastic feed tanks, one for each pair of benches, which provide capillary watering and maintains the required water level on the benches. This automatic water feed saves labour and prevents the benches from drying out.

The lighting installation has been designed to provide a level of illumination of 1,000 lumens per sq. ft. of bench area, 14-8 ft. 125 watt warm white fluorescent tubes are mounted 1 ft. 6 in. from the centre of the tubes to the top of the seed boxes on the bench with irregular spacing calculated to give even illumination across the bench.

To counteract a fall off in intensity at the ends of the benches single 4 ft. tubes are mounted at each end of the bench across the main lighting system. The bottoms of the benches, walls and ceiling of the room are painted white to maintain the level of light intensity and the control gear of the fluorescent tubes is mounted on the outside of the room so that the heat developed does not influence the growth room temperature.

Heat from the tubes illuminating the bench below can lift the temperature of the bench above by as much as 15 deg. F. and in fact bench temperatures have varied, from 65 deg. F. when the lamps are not in use at night to 82 deg. F. when the tubes are operating, without detrimental effect to the seedlings. The two lower benches having no tubes below them to provide heating are warmed by a 0.5 kW soil warming cable in each controlled by a 24 in. rod type thermostat inserted in the bench below the seed boxes.

Tomato Crop

The growing room was brought into use on November 22 last year and Asmer variety Axis Cross tomato seed was space sown 1½ in. apart in boxes of J.I.P.I. at a temperature of 70 deg. F. and lights switched on for a period of 14 hours each day. At this spacing a total of 10,500 seedlings were accommodated in the room and after approximately 18 days they were well developed, sturdy and uniform in size being at the third true leaf stage.

The young plants were then pricked out into 2½ in. square plastic pots of J.I.P.2, each bench accommodating 420 pots and a total of just over 2,500 plants in the growing room. The remainder were held in the propagating house on wooden benches at a day and night temperature of 56 deg. F. await their turn in the growing room.

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Editor's note: There has been a great deal of interest by British growers on the use of growing rooms. We think there is merit in growing rooms in the USA and therefore, are reprinting this article.

Growing-Rooms

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Day Length

Illumination in the growing room was continued providing a 14-hour day length at a temperature of 70 deg. F. which was dropped to 62 deg. F. during the night. After a further period of about seven days the plants were at the sixth true leaf stage with the first truss being visible in the top of the plants.

The leaves of the plants were now touching and were again spaced down to 270 plants per bench for a further seven days treatment when the first truss was then well developed. At this stage the pots were laid out in their final planting positions and when 60 per cent of the plants were showing a flower fully open they were then planted out.

Seed was sown about three weeks later than usual and after a period of about eight weeks 50 per cent of the plants were in the planting position and considered to be about four weeks in advance of the normal sowing date.

Weekly Consumption

The electrical consumption of the growth room has recorded an average of 1430kWH per week and it is estimated that the running cost of raising the seedlings to the planting out stage is a little over 3d. per plant (approx. 3 cents.)

This successful manipulation of nature's normal seasonal growing cycle produces a better balanced plant in comparison with the conventional winter propagated one and only occupies an area of approximately 10 ft. x 10 ft. for the growing room with the propagating holding area of 14 ft. x 110 ft. Previously 10,500 tomato plants in 4¼ in. plastic pots occupied an area of 70 ft. x 170 ft. and this has now been used for an additional crop of 23,000 lettuces which were also germinated in the growing room.

Sound Economy

The Walker brothers maintain that their experience shows there is a sound economic justification for the initial capital cost of the growth room which for the system described was just under £800 including labour (less than $2000.)

It seems that the capital cost of the equipment may be recovered over a two-year period by the saving in heating costs on previous propagation methods and with the extra income from space saved which was used for additional lettuces. The growth room has also made a saving of labour in handling plants during propagation and next season it is anticipated that this labour will be used in the proposed increase in glass.