MARGARET McKAY: Flora legislation is currently being rewritten so now is the time to put forward ideas on this matter. This Society should take up the issue.

ELECTRIC SOIL AND HOT-HOUSE HEATING

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The electric heating of seed and cutting beds and of hothouses has resulted in a marked improvement in plant production and quality.

With tomato seeds the heating of seed beds has reduced the time between seeding and planting by five weeks. Capsicums, which are normally difficult to raise during the winter, sold four to five weeks before seedlings planted from unheated beds. Croton, hibiscus, camellia, macadamia, celery, and passion fruit have been produced with great success, being struck and grown during the winter and sold in early summer. The grower can now compete on a market where it was not possible to do so before.

The use of a 32-volt system enables low cost, easily replaceable galvanized iron wire elements to be used. These can be installed by the grower and adapted to suit his particular conditions and application.

BED CONSTRUCTION

The following descriptions apply to seed beds and hothouse installations known to be successful. However changes in detail could readily be incorporated to suit existing installations and to cater for special plant requirements.

Exterior Seed Beds: Prepare a 6 inch deep bed of the area required above a layer of plastic sheeting, perforated to permit good drainage. The bottom two inches should be of screenings or sandy loam on which the element is run. The top four inches should be of soil or sand depending on the plants to be grown. (Fig. 1)

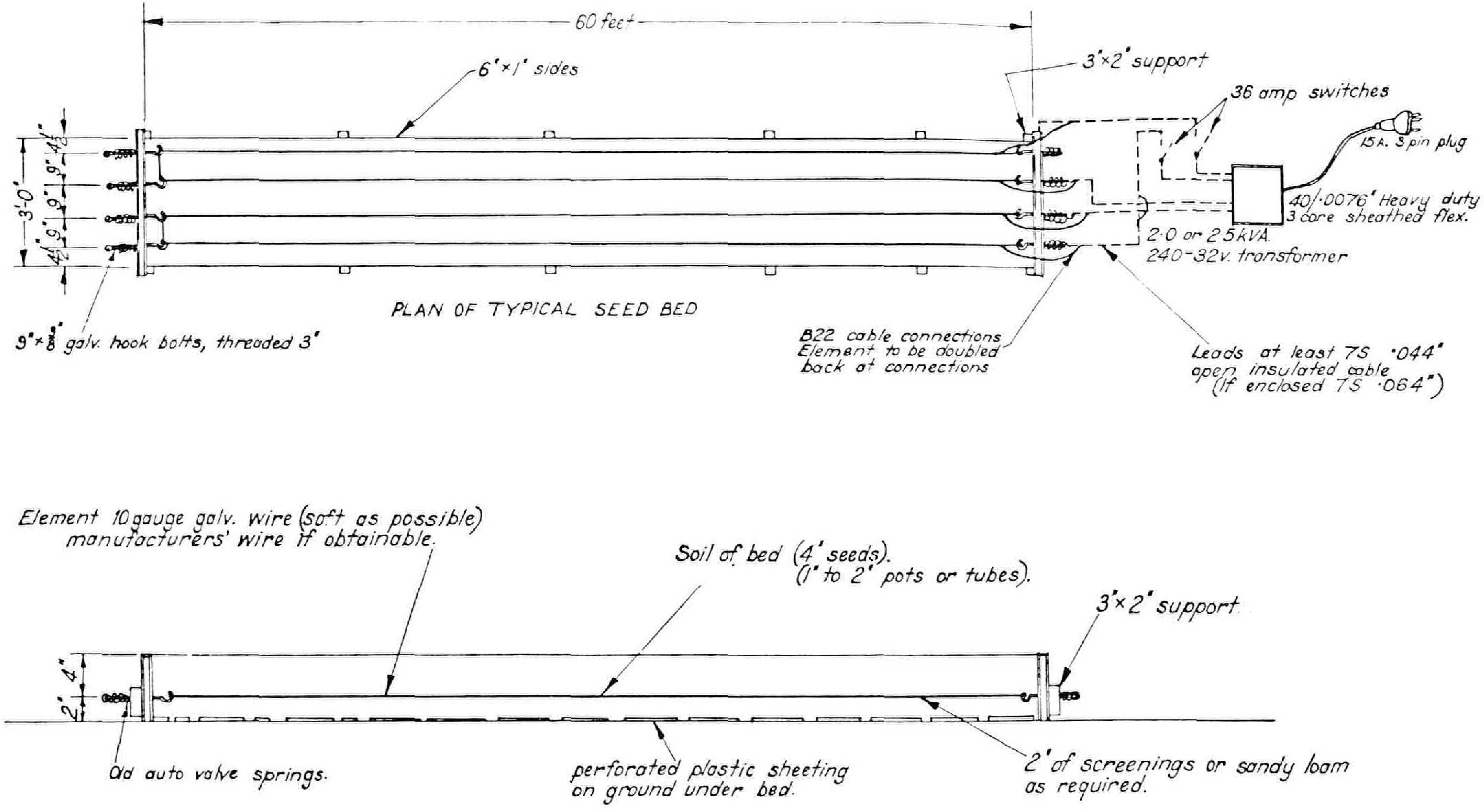

Figure 1. Construction details for a 180 square feet farm seed bed or nursery propagation bed with 32 volt electric heating system.

Hot-House Beds: Elements can be installed in elevated beds made of corrugated asbestos cement covered with flat 3/16″ fibre cement as flooring and sides. A bed thickness of approximately 6 inches is common. Where adequate misting is employed the thickness may be reduced to two inches. Construction is as for seed beds (Fig. 1).

For potted plants such as African violets the element can be run in open air beneath the floor of the bench.

ELEMENT AND ELECTRICAL DETAILS

Element: The element found most suitable is 10 gauge galvanized tie or fencing wire, as soft as possible, with the length selected to suit the required heating. An estimate of the watts for various lengths of element can be obtained from Fig. 2. The length of element is the total length connected across the 32 volt supply. The wire should be as close to pure iron as is possible with a minimum amount of carbon to reduce corrosion. The connections shown in Fig. 1 consist of two elements connected in parallel, each 120 feet long and from Fig. 2 the power consumption for 10 gauge wire is 960 watts for each element.

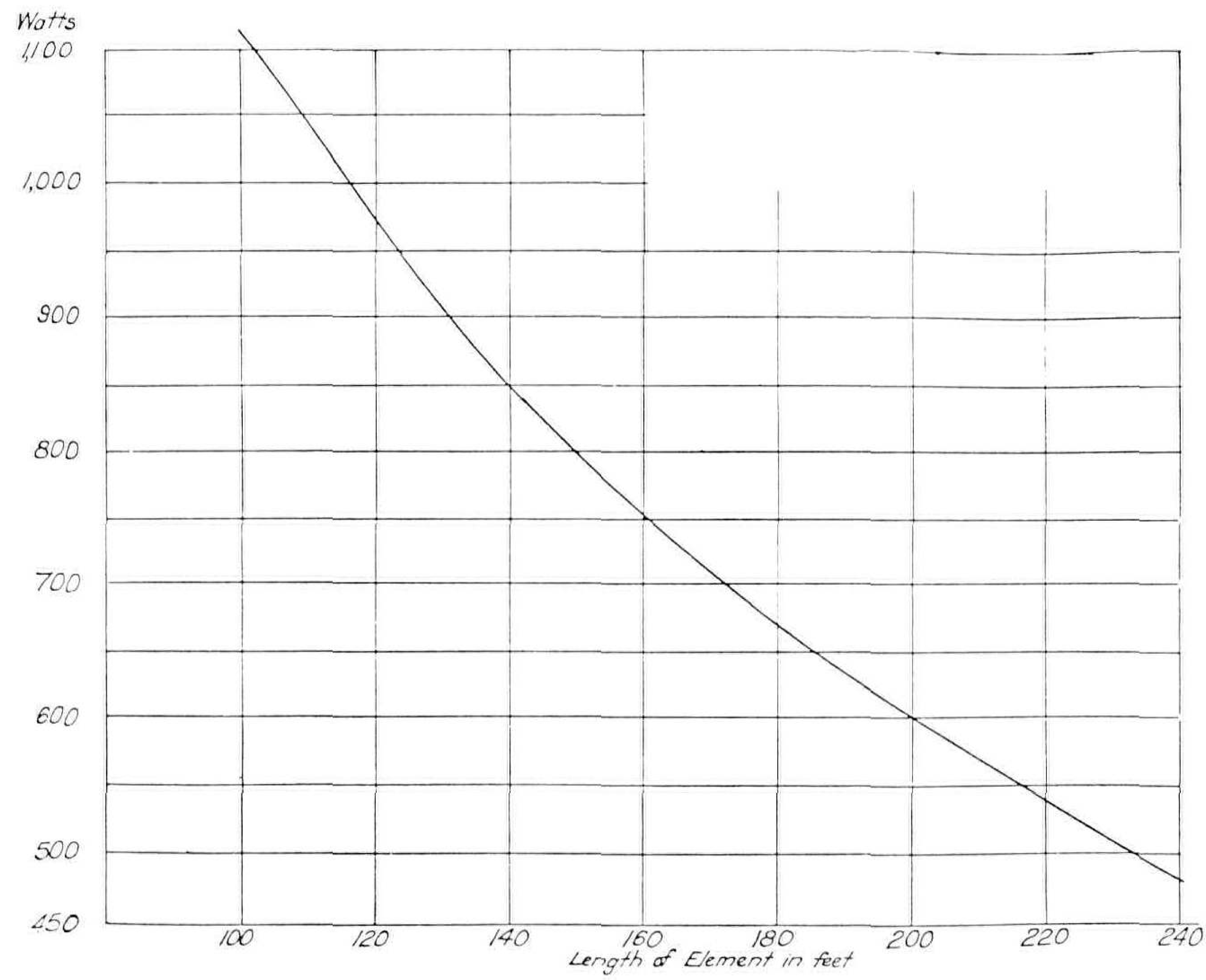

Figure 2. Average wattage for different lengths of element connected across a 32 volt supply. Element of 10S.W.G. fencing wire (soft).

Hence the total wattage is 2 × 960 = 1,920 watts. The total bed area of 60 feet × 3 feet is 180 square feet, so the system provides 10.5 watts per square foot of bed area. The wattage required per square foot can vary over a wide range up to 15 depending on the type of plant, the weather conditions, the bed location and the stage of the plants. If the two elements are connected in series across the 32 volt supply, resulting in a single 240 foot element, the total wattage — from Fig. 2 — is 480 watts, or 2.66 watts per square foot of bed area. This reconnection permits a more gradual reduction in temperature before planting out.

Corrosion is a problem where the temperature exceeds 80°F and when plant nutrients are used. Care must be taken that all connections are made outside the bed where it is cooler and where corrosion due to electrolysis at the junction of copper cable and the ferrous element can be minimized. The expansion and contraction of the element must be taken up by springs as shown in Fig. 1.

Transformer: A 240/32 volt transformer with a kVA rating at least 25% greater than the required total element wattage should be used. This results in a 2.5 kVA unit being required for the 1920 watt bed detailed in Fig. 1.

BED OPERATION

The optimum temperature and mode of operation can only be determined by experience, and only a general guide can be given.

With 10 watts per square foot a bed temperature of 75° to 80°F can be maintained. In a glass house with plastic sheeting ceiling lining this will keep the house air temperature 10° above outside ambient. When automatic misting is installed up to 15 watts per square foot may be required to maintain these temperatures. Thermostatic or manual temperature control may be used.

RESULTS

Plants produced in heated beds are stronger and more productive than those raised without heating. The time required is considerably reduced. The number of tomato fruits produced on the first trusses of the plants is much greater when raised in heated beds, due to the more favorable conditions for the young seedlings. Nurserymen are able to grow plants in winter for sale in early spring.

However, a word of caution. Before proceeding with installation it would be wise to check with your local electrical authority to make sure that this system of heating is acceptable to them. It is a tried and proven method and certainly works well. It is widely used in Queensland and northern new South Wales.

VEGETATIVE PROPAGATION OF *EUCALYPTUS FICIFOLIA* F. MUELL BY NODAL CULTURE *IN VITRO*

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Abstract. The red-flowering gum, *Eucalyptus ficifolia*, is a very attractive ornamental tree which is propagated by seed because, like many tree species, it is difficult to propagate by cuttings, budding and other classical methods of vegetative propagation. Although the flower colour on individual trees is the same, it is highly variable on different trees reared from seed and can be white, pink, orange, scarlet red or maroon. A method for the clonal propagation of *E. ficifolia* using nodal culture has been developed which involves first the culture of nodes, second the subculture of nodes excised from shoots on the primary cultures and finally the initiation of roots on subcultured nodes.

REVIEW OF LITERATURE

There have been several attempts to regenerate plants from callus of various species of *Eucalyptus* (4,7,9) and successful regeneration has been reported for *E. citriodora* (1) and *E. alba* (8). Organ culture of nodes has also been successful with *E. grandis* (2,3,7). The research with *E. ficifolia* was done using the Broad Spectrum approach which was tested first with tobacco (6) and later with strawberry, and led to the development of a very high multiplication rate (10).

MATERIALS AND METHODS

Culture of aseptic seedlings of *E. ficifolia:* Seeds were treated with 0.1% (v/v) 7X detergent and 5% (w/v) calcium hypochlorite for 20 min, followed by several rinses in sterile water and were then planted on sterile medium-B (5).

Culture of nodes from aseptic seedlings: When the aseptic seedlings had developed six nodes (node 1 — cotyledonary