SATURDAY AFTERNOON SESSION
December 6, 1958

The meeting was called to order at one forty-five oclock by President Steavenson.

PRESIDENT STEAVENSON. Here is a wire just received from Louis Vanderbrook, who was our President of last year.

"Dear Hugh, please convey to the members my sincere appreciation of the beautiful flowers sent me They certainly brighten my hospital room and help to alleviate the pain I hope this will be the biggest and best meeting in the history of our organization. God bless you all"

I know Louis will be gratified to learn that as a matter of fact it is the biggest and I trust the best. Registration is well up over 200.

This afternoon we have as our moderator none other than Mayor Zophar P. Warner. Some of you may not know that he has been mayor of one of the outlying metropolises until his success as a nurseryman caused him to shell his duties. He is now a full-time propagator.

So with this introduction, I am most pleased to give you our friend and fellow grower, Zophar P Warner. (Applause)

MODERATOR WARNER: As you all know, a politician has to be a good speaker, and I had a very short tenure in office. When I get through with this panel, you will see why I was wise enough not to keep on with my political affiliations

My duties here this afternoon are principally to make sure that we are through by three-thirty, and with that in mind I am not going to make a very lengthy introductory statement. I don't think we will have time for question periods after the speakers The most worthwhile questions can come at the end of the program, providing we have any time

Without further comment we are going to start right off, with Professor F. L. S O'Rourke, Michigan State University. Professor O'Rourke.

Professor F. L S O'Rourke presented his paper entitled, "Efficient Propagation with Hardwood Cuttings in England." (Applause)

EFFICIENT PROPAGATION WITH HARDWOOD CUTTINGS IN ENGLAND

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The hardwood cutting method of propagation is relatively convenient and inexpensive and whenever reasonably good results are obtained by the use of hardwood cuttings, that method is usually preferred to layering, grafting, or the other more cumbersome types of propagation. Several discoveries recently made by Mr. R. J. Garner and Dr. E. S. J Hatcher at the East Malling Research Station in Kent, England,

may lead the way to a much more extensive use of hardwood cuttings for propagation in the future. These investigators have studied the propagative factors affecting hardwood cuttings from three aspects, (1) the source plant and the condition of the cutting wood before taking, (2) the care and handling after collection, (3) the environment under which the cuttings are rooted.

An analysis of the factors affecting the source plant from which the cuttings are taken shows the extreme importance of this consideration It includes a study of the particular clone involved, its genetic constitution, state of nutrition, carbohydrate reserve, degree of lignification, period of establishment in the soil, chronological age, and the particular degree of juvenility, senility, the vegetative or reproductive condition of the plant or portions thereof from which the cutting wood is taken. Equally important is the consideration of the age, size, position on plant, and date and manner of collection of the cutting wood.

The East Malling experiments with various apple selections show that cuttings taken from a clone budded on a vigorous rootstock root and survived to a greater degree than those taken from the same clone budded on weaker rootstocks Other tests report that the rooting of cuttings taken from hedges that are kept in a vegetative condition by close pruning is superior to those taken from nursery plants or from the upper portions of layered stems in the stool blocks It is also indicated that cuttings taken relatively early in the fall (October) survive to a higher degree than those collected in the late fall or during the winter.

A rather difficult-to-root apple selection known as Crab C has been used as the test plant in these experiments Scions of Crab C were grafted on a number of rootstocks and when grown, hardwood cutting material was taken for comparison. The results are shown in the following table:

Table 1.—Per cent rooting of hardwood cuttings of the apple clone Crab C taken from different plants grafted upon several rootstocks.

Rootstock	Vigor of rootstock	Per cent rooted
M IX	Weak	21
M II	Medium	35
M VII	Medium	37
M XVI	Vigorous	59
M Crab C	Fairly vigorous	40

Malling XVI, a vigorous rootstock, thus imparted to the wood of the scion variety the propagative ability to root nearly three times as well as wood from the same clone grafted on the weak rootstock Malling IX.

Hedges of various own-rooted clones of apple and plum had been established as windbreaks at East Malling. These hedges, about 7 feet high by 30 inches wide, were kept in a *vegetative* condition by close clipping and the removal of the flowering wood. Hardwood cuttings taken from these hedges were found to root to a much greater degree

than cuttings taken from plants growing in the nursery. The differences are shown in Table 2

Table 2.—Per cent rooting of Malling Crab C apple cuttings.

	From nursery plants	From hedge plants
Basal cuttings (12″ base of 1-year shoot)	0	45
Second cuttings (Next 12″ above basal cutting)	6	42

As yet, no data are available as to cuttings taken from hedges formed of the selected clone grafted on the most vigorous rootstocks. The possibilities in combining these two discoveries to grow "source plants" are immense and may make the stool-bed layer method obsolete for the great majority of clones now being propagated by that means. While the East Malling experiments have been concerned solely with fruit plants, the same principles may well apply to woody plants used for other purposes.

The East Malling investigations concerned with the care and handling of hardwood cuttings after collection include studies pertaining to the length and diameter of the cutting, wounding, callusing, rate and manner of application of synthetic growth regulators, temperature conditions, storage, and date and method of planting. The results of the many experiments may be briefly summarized as follows:

a — The concentrated solution method, also known as the "quick dip" method, at a rate of 2½ milligrams of indolebutyric acid to 1 milliliter of 50 per cent alcohol is effective for most hardwood cuttings.

b — The most effective size of cutting is about 12 inches in length with a diameter between 6 and 10 millimeters

c — Rooting and survival are greater when the cuttings are taken in October and stored over winter with the bases plunged in a peat-sand medium heated to 45° F. Frames equipped with electric heating cables and insulated with bales of straw have been used successfully.

The importance of treating with IBA (indolebutyric acid) and storing at 45° F. over winter is shown in the following table:

Table 3.—Per cent rooting of M Crab C apple cuttings stored and field planted.

Treatment	Position	Cuttings taken and stored			Cuttings taken and planted in fall
		Oct	Nov	Dec	
None	Basal	0	0	3	13
None	Second	0	0	0	0
IBA	Basal	87	31	37	23
IBA	Second	81	68	22	2

Studies in relation to the factors of the environment of the cutting while in the process of rooting are also being carried out at East Malling, particularly in regard to the most favorable moisture and air content of the soil, and the most favorable temperature to induce rooting. The result will be reported when more data are available

The East Malling investigators have opened several new avenues for further research The influence of vigor-inducing rootstocks and the use of vegetative wood from hedges should be considered in relation to accepted theories of physiological juvenility The propagative power of hardwood stem tissue has definitely been increased by these methods The interrelationship of time of collection, growth regulator treatment, and controlled-temperature storage is significant. The application of these principles and methods with proper modifications to other plant species should advance the progress and knowledge of plant propagation quite materially.

Acknowledgement:
The writer extends his thanks and appreciation to Mr R J. Garner and Dr. E S J. Hatcher of the East Malling Research Station for their kindly cooperation and the unreserved contributions of their research data.

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MODERATOR WARNER 'The next man on our program is Mr. March of the National Arboretum in Washington, D.C. He will discuss the hardy eucalypti

Mr. Sylvester G March read his prepared address on "Hardy Eucalypts." (Applause)

HARDY EUCALYPTS

SYLVESTER G. MARCH
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The mention of eucalyptus to most people brings to mind thoughts of the Koala bear and Australia Uniquely, the genus *Eucalyptus,* with its 500 species, is native only to Australia, Tasmania, and neighboring islands.

In addition to eucalyptus leaves being an essential part of the diet of the Koala, eucalypts play an important role in the economy of Australia Its wood is used for paper pulp, fibreboard, commercial lumber, firewood and charcoal. From its bark comes tannin and from its leaves, essential oils. These essential oils are used in disinfectants, perfumes and medicines.

At the turn of the century a good deal of effort was expended to establish plantations of this rapid-growing tree in California, New Mexico, Arizona, and Florida, but land proved to be of greater value for farming and therefore most of the eucalypt plantations have disappeared. Today, in California the eucalypt is best known as an ornamental tree for street planting. So intensively have they been planted there, that most Californians believe them to be indigenous. There is a story told about a soldier from California stationed in Australia during World War II in which he remarked, "Say, you got some of our eucalpts here!"

In its native habitat the genus is distributed widely over areas of greatly varying climatic conditions. The regions that interest us most