(Editor's note: Mr Steavenson reviewed his talk by showing a series of colored slides which illustrated the principle features of his discussion).

MODERATOR FILLMORE: We thank you, Hugh Steavenson, very much.

We will proceed now to the next two speakers and there will be a brief question period following the addresses by Harvey Gray and John Roller Mr. Harvey Gray, please.

Mr. HARVEY GRAY: I fear this might be a little bit hard on you fellows to have a double take as far as my presence is concerned, although I hope you will bear with me on the subject of yew and juniper cuttings under what I propose to call a vaporproof chamber.

Mr. Gray discussed the subject of rooting evergreens in a vaporproof chamber. (Applause)

THE VAPORPROOF CHAMBER

HARVEY GRAY
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What I have in mind as a vaporproof chamber, I think was brought out a year ago in Cleveland. However, for those who were not there I would just briefly make a statement as to what my conception is of a vaporproof chamber.

A vaporproof chamber, as I visualize it, is made of polyethylene plastic, as was first brought to the Society's attention in Cleveland several years ago by Roger Coggeshall I have modified some of the points that were originally presented by Roger in an effort to make sure that the area is really vaporproof.

I mean to say that if this case, which is rarely ever 12 inches high (the width and length of the case is immaterial, but the height I feel is quite important) is down on the ground, as in the case of a ground bed, then we are only concerned with sealing this vaportight by stretching our plastic to the ground over the top, over the ends, and sealing it with soil.

However, if it is on an elevated structure, such as a bench, with wet pipes quite likely underneath for bottom heat, the plastic will go on the bench bottom before any media is placed in it. The plastic will come up the sides and then over the top as well as across the ends and sealed as tightly as it is humanly possible. This is my concept of a vaporproof chamber.

Now that this chamber has become vaporproof, no water can escape except for the extremely minute amount that can and apparently does pass through the plastic itself.

Now on the subject of rooting of yews and junipers in such a chamber; two years ago we set out some trials with yews in the summer time. The *Taxus* cuttings were made when the plants had produced about eight inches of growth and were treated with a growth regulator.

One batch of cuttings was placed under intermittent mist. The other batch was placed under this vaporproof chamber. The vaporproof

chamber was placed in a position to take advantage of the coined term "north light". This implies, then, that there is no direct sun's rays falling on the case. Therefore, the temperature that would be generated in this case could be no more on the inside than it is in the shade on the outside of the case. This is to say, if it is 70°F. in the shade out of the case it will be 70°F inside the case The amount of light that falls on the case under the plastic with this north light, of course, varies with the amount of light intensity that particular day and hour. On bright days, naturally, the foot candle power would be higher than on dull days. With the photographic lightmeter we were able to ascertain about 1,000 foot candles on a very bright day in this shaded area of north light

At the same time, a comparable batch was placed under glass in a greenhouse with the intermittent mist. At the close of the fall season, both batches were checked. We noticed that under the intermittent mist, in the greenhouse which was not shaded, we had some very nice rooting of the *Taxus* cuttings, in spite of the fact that they were as yellow as if they might have been painted with a yellow paint They, nevertheless, were well-rooted

The material placed in the plastic vaporproof chamber also rooted, but rooted less well. The roots were not as long nor was the percentage as good as it was in the case of the intermittent mist in the unshaded greenhouse.

In another study a number of *Taxus* cuttings were made in the conventional manner in November and placed in the greenhouse We had three different areas for study, ie, (1) where the cuttings were handled on the accepted manner by syringing, (2) another, where intermittent mist was used and (3) where a group was under the polyethylene vaporproof chamber.

This work was done two years ago, so I cannot give you the exact figures. However, I recall that of these three different batches of cuttings, the one that gave us the best results in the end was the old method where we stick the cuttings in a good grade of concrete sand, placed them in a bench with bottom heat and our percentage of rooting was quite acceptable and favorable, ie., 90 per cent or better.

In the case of the polyethylene tent the results were miserably poor, as was true of the misting trial.

Now I would like to reason out why we had such poor results with the material in the vaporproof case and under mist. Apparently, there is a very close correlation between water application, the media, and the latter's ability to hold water and air The more misting we do, the more we close up our pore space in the medium which results in difficulty.

In the case of the polyethylene chamber, let us say that at a temperature of 50 degrees Fahrenheit, there is sufficient space to hold one ounce of water in the vaporized form. Now let us assume that the temperature goes up some 25 degrees inside the case As a result another ounce of water will find its way into this atmosphere inside the chamber This moisture naturally is going to come out of the foliage, off the foliage, off the medium or out of the medium.

As the temperature arises to 90 degrees I am told there will be three times the amount of water lost that was lost at 50 degres In other words,

there will be three ounces of water in vaporized form in this chamber. Where did it come from? Again, from the source that I have indicated.

Now the speed at which water moves from the liquid to the vapor phase, of course, is related to the temperature rise. If the temperature jumps rapidly there is naturally going to be a drop in the relative humidity.

This fact suggests that in propagating with the vapor chamber that we should never tolerate rapid temperature fluctuations It also suggests with a quick drop in temperature this water will also go back into a liquid form. This first collects on the wall of the case or the plastic.

Now if this plastic is concave, there is a pretty good chance that the water will run to the lowest point, which is in the middle of this case. On the other hand, if it is convex, the water will run to the sides. We would find that after an interval of time, say some two months without opening the case, either the center of the bed is pretty well dried or the sides are dried, depending on the shape of the polyethylene cover.

This presents a partial answer to some of the problems that we run into with this so-called vaporproof chamber.

Now I don't want to steal any of Roger Coggeshall's talk, but I do want to bring this to the group's attention, as I feel it has an effect on the operation of the vaporproof chamber. In the original description of this chamber mention was made of the use of cheesecloth, which was placed under the plastic. It was the originators idea, I believe, for this cheesecloth to serve as a device for shade. My concept on the need for this cheesecloth is different. I believe that this cheesecloth acts as an absorber for this condensing water, which in turn prevents uneven distribution of water in the medium.

And so I would go on record as saying that the cheesecloth or gauze that is put under the plastic acts as a holding or wicking device. The moisture as it moves from the liquid to the vaporized form within the case will move off the cheesecloth or gauze rather than out of the cuttings or medium. The loss of water will first take place from this device rather than from the cutting or medium.

These observations may be taken for what they are worth in relation to this particular business of rooting evergreen cuttings in the vapor chamber.

I would like to add one more comment relative to the rooting of *Taxus* and juniper cuttings. It has been my observation that regardless of the system used to propagate these plants that a good grade of clean, sharp, sterile sand, possibly of the so-called concrete grade, has given us our most uniform rooting results. Thank you

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MODERATOR FILMORE: Now we will hear again from John B. Roller. He is sure to have some good ideas on this airtight polyethylene enclosure. John Roller of Scottsville, Texas.

Mr. John Roller discussed the topic of rooting cuttings under the polyethylene tent. (Applause)