# FRIDAY MORNING SESSION

## December 9, 1966

The session convened at 9:00 a.m. in the Colonial Room Viking Hotel.

STU NELSON: To act as moderator for this morning we have Dr. Jacob Tinga who will also give the first paper.

### BACKGROUND INFORMATION ON OVERWINTERING

J. H. TINGA
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This is a broad subject touching many aspects of the plant growing business, but generally we can say we are concerned with the effect of low temperature on woody plants. Also, sun and wind have bad effects.

This effect is different for *different years.* I hear the old timers talk about the near famine winter of 1898 and the bad influenza and deep snow of 1917. Many here remember that all Baldwin apple trees froze in New York State in 1935. We are still recovering from the wind and ice of 1963.

The effect is different for *different months.* Most recent for me was May 6, 1966, when a 24 degree night took all the new growth from boxwood and Taxus. Tulip Tree and White Oak were defoliated in the forest. This damage was associated with the tender stage of growth of the plants. We call this a late spring frost. Then there was the early fall frost of October 7, 1965, with the same dramatic results. In addition, I remember the 60 mile wind and minus ten F. temperature of February 1, 1966.

So far, with all our billions of dollars and ingenious space study, we have not yet approached weather control in any large scale. Check with the Navajo rain dancers and snake handlers and woolly bears for the latest unreliable information on weather predictions.

Most of us are gullible enough to think and hope for a nice average winter, but that is because we do not take seriously the hard lesson of the history of weather. Will it be average or the worst possible winter?

Then take our nursery production practices. Tender varieties are moving north. Kurume azaleas are being sold at least one hardiness zone north of their area of good growth over the 30 year scale. Gardenias and Crepe Myrtles and Rhododendrons and Jap Holly are pushing against the north wall of their confined area, and you are helping them push to the northern market.

Then, worst or best, according to your point of view, is container production. It is possible to mass produce and market excellent plants in cans up to that exceptional day when the south side of the can gets too hot and half the roots die or the north side of the exposed root system get too cold and half the roots die or the top suffers from a common malady called winter drought and the exposed leaves burn or dry.

There are several learned papers on how wet and aerated a woody plant soil should be and how much nitrogen, phosphate, and potash a container grown root should be exposed to; but what is the condition in *your field* on December 9, 1966. Management sometimes finds it economically impossible to apply near optimum conditions to rooted cuttings or lining out stock. We *know* better than we *do*.

And I hear rumors that some of you have had trouble with herbicides on small plants in the field or in containers. On the first day of May it may look like winter injury, but close examination may show that the shallow woody plant roots were caused to be non-functional along with shallow chick weed roots.

Does the propagator have winter problems. Yes. What can he do? Consider all the facts and realize that the plant growing world *is not* a controlled environment. Therefore, *share the risk.* Share one year's risk with another by holding back some liquid assets (money in the bank). Share the risk on plant species. Don't get "over your head" in tender azalea varieties. Share the risk of container grown plants by *modifying* the temperature extreme that you might expect. This is the *insurance principle.* We have life insurance and fire insurance. Why not have winter injury to woody plant insurance? The risk is great, so the premium is high for gardenias and Camellias in Connecticut. Now we are down to the level of talking about *reasonable self-insurance costs* for reasonable risks.

In our work we routinely modify the air temperature over a Pyracantha or Chinese Holly in one gallon cans for 8 cents per sq. ft. a season. When it is zero outside, it is 20 degrees inside of our winter protection shelter. When it is 15 degrees outside, our gardenia in 3 gallon cans under the shelter may be 25 inside the leaf. This changes a hard winter into a mild winter with no heat bill.

The cost of building a safe, inexpensive structure is the insurance premium you pay for growing plants in a reasonable risk situation in winter.

If the same structure can be used for summer propagation (which ours is) the winter insurance may be cut in half.

Let us look at some of these structures and some effects on temperature and moisture. In a plastic covered structure we have dew almost every night, a sign of high humidity. Nonetheless, we find it advisable to water plants at least once a month. We can do this with our mist line which is drained after every winter use.

Let me give you a few results of the way plants responded to these various structures. In our heavily shaded structures we are getting short day effects. With 75% shade at noon, the sun goes down earlier — or so the plant thinks.

MINIMUM NIGHT TEMPERATURES RECORED UNDER FIVE PLANT STORAGE CONDITIONS AT BLACKSBURG, VIRGINIA, JANUARY, 1966, (DEGREES F)

| | Outside at 6 in plant height, fully exposed | Sunken cold frame, 5 ft deep, heated with 2 x 100 watt bulbs per 333 sq ft | "A" frame with 4 mil poly sprayed with aluminum paint | "A" frame with 4 mil poly sprayed with more aluminum paint and inner layer of plastic | Lath house 50 per cent wind barrier |
|---|---|---|---|---|---|
| | 8 | 34 | 24 | 26 | 12 |
| | 11 | 35 | 26 | 28 | 16 |
| | 13 | 34 | 26 | 27 | 18 |
| | 16 | 36 | 29 | 29 | 21 |
| | 21 | 38 | 30 | 31 | 25 |
| Per Cent of Noon Time Shade | Zero | 85% | 75% | 98% | 50% |
| Actual Foot Candles | 12,000 | 1,900 | 2,900 | 200 | 6,000 |

## *Plant Species Used In Winter Protection Studies*

Treatments.

(1) A frame with 45 degree roof of clear plastic over lath shade—not mulched—watered once a month

(2) Under lath shade with the container covered with sawdust

(3) In open field with container covered with sawdust

The percentage of the number of normal leaves on the top half of the plant. Top leaves influence saleability of plants in spring

| | 1 | 2 | 3 |
|---|---|---|---|
| Aucuba japonica variagata, B & B, 24" | 95% | 84% | no trt |
| Azalea coral Bell, B & B, 12" | 98% | 79% | no trt |
| Azalea, Rose greely white, B & B, 9" | 99% | 69% | no trt. |
| Berberis Juliana, B & B, 24" | 99% | 80% | 58% (leaf drop) |
| Camellia japonica, Victory white, B & B, 36" | 96% | 48% | no trt |
| Camellia japonica, Pink perfection, B & B, 36" | 96% | 51% | no trt |
| Camellia sasanqua, Mine no Yuki, B & B, 48" | 96% | 58% | no trt. |
| Cleyera japonica, B & B, 36" | 96% | 62% | no trt |
| Cotoneaster repens, 3 g c, 24" | 90% | 79% | 55% |
| Gardenia florida, B & B, 48" | 71% | 5% | 0% (dead to soil) |
| All plants chlorotic at start of treatment | | | |
| Ilex cornuta burfori | 95% | 55% | 9% |
| Ilex crenata convexa, 1 g c, 18" | 98% | 72% | 65% |
| Ilex crenata helleri, 1 g c, 12" | 99% | 74% | 43% (tip brown) |
| Ilex pernyi, 5" pot | 98% | 85% | no trt |

| | | | |
|---|---|---|---|
| Ilex vomitoria, 1 g c, 10″ | 95% | 63% | 22% (dead tips) |
| Lagerstroemia Indica, 1 g c, 18″ | 90% | 12% | 0% (dead to soil) |
| Ligustrum lucidum, B & B, 24″ | 98% | 79% | 38% |
| Osmanthus fortunei, 1 g c, 24″ | 99% | 88% | 30% |
| Prunus laurocerasus, Schipka, B & B, 30″ | 95% | 78% | 47% |
| Pyracantha coccinea graberi 3 g c, 36″ | 91% | 7% | 0% (dead to soil) |
| Pyracantha coccinea, Lalandi, 3 g c 36″ | 96% | 40% | 5% defoliated |
| Pyracantha fruit still good on April 1, only under A frame | | | |

MODERATOR TINGA: I hope I have successfully introduced the subject of overwintering for now we will have some experts who are going to give us the latest information. The first presentation will be by Richard Vanderbilt.

## A LOW COST OVERWINTERING STRUCTURE

RICHARD T. VANDERBILT
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*West Grove, Pennsylvania*

The structure is a 14′ span polyethylene covered quonset house. The cost is about twelve cents a square foot in place and covered. We use it for winter protection of container grown material and to replace cold frames.

This structure evolved into a quonset house quite accidentally. We had considered, and to some extent, used the type of structures long since made famous by Bill Cunningham. Bill's designs are excellent and their only drawback is cost; about 50 to 60 cents a square foot. This cost can be sizeable when you need houses in multiples of miles. We have four miles of the 14′ houses up at present.

Up until three years ago we were using concrete reinforcing wire to support the polyethylene above our cans. It is a material that did do the job after a fashion. It is almost impossible to work around once put in place. Watering is very difficult. Pulling plants is impossible without tunneling in from the ends. Covering is a problem because of the many sharp edges that seem to always tear the polyethylene unless laboriously wrapped with burlap. To insure against collapsing, we have to use a center stake about every 4 feet. Finally when the time comes to remove the polyethylene, the whole unwieldy mess has to be picked up, carried out and stored some place.

Our first step to get away from this nightmare was to simply take a 10′ piece of ¾″ E.M.T. thin wall electrical conduit and bend it so it spanned six feet. The ends were drilled 4″ up, a nail inserted and bent over to act as a stop. We used a spacing of 5′ between hoops. They were then covered with 12′ wide polyethylene and the sides held down with soil. This worked beautifully. The hoops could remain in place summer and winter without interfering with cultural operations and