THURSDAY AFTERNOON SESSION

December 6, 1962

The second session convened at 1:45 o'clock, President Snyder presiding.

PRESIDENT SNYDER: This afternoon's session is a Panel Discussion on Cultural Aspects of Plant Propagation. The moderator is Fred C. Galle, Ida Cason Galloway Gardens, Pine Mountain, Georgia.

MODERATOR GALLE: We are a little bit behind, so our first panelist will talk on Chemicals and Soil Amendments — Dr. J. B. Gartner, Department of Horticulture, University of Illinois, Urbana, Illinois.

CHEMICALS AND SOIL AMENDMENTS

J. B. GARTNER
Department of Horticulture
University of Illinois

First of all, when John Mahlstede asked me to appear, I told him I would be happy to. I thought I would have a message I could present, but the more I think about it the more I wonder why I am up here. There are probably two good reasons why I accepted. One was the fact that at Universities we don't get the opportunity to travel at will, and it gave me the opportunity of attending the Society Meeting, which I am happy to do. Another reason is that we were conducing some experiments pertaining to chemicals and soil amendments. I will discuss these later.

First of all, I would like to go back and review some of the older materials that have been used as aids in transplanting.

Wax Emulsions

In 1937, Dr. Miller of Michigan State University developed a wax emulsion that proved successful in reducing transpiration when applied to nursery stock. This material was placed on the market and sold under the trade name of Dow Wax. For a number of years, this material was used by nurserymen in transplanting nursery stock.

Plastics became popular during the war and in 1948, while at Michigan State University, O'Rourke, Hamner and myself became interested in some of the new plastics. One of these new plastics looked very promising as an aid to transplanting since it was nontoxic, transparent and dried at room temperature. The plastic is a polyvinylchloride resin which at the time was named Geon 31X. Today this material is sold as Transplant Coat, Wiltpruf, and many other trade names. When we first started testing this material, we tried it on cut Christmas greens and cut Christmas trees. We had excellent results with this experiment and was able to reduce the dry-

ing of these materials from 25-30%. This was a considerable aid in keeping cut trees and greens fresh.

Since the results were good with the cut trees, experiments were started on live material. During the month of July, Norway Spruce were treated and transplanted bare root without any supplemental water. This was a severe test since it is unheard of to transplant evergreens in the middle of July bare root. The loss was high with only a 25% survival of the treated plants, however, in the controls there was a loss of 100%.

Since these results were favorable, several species of deciduous shrubs, apple trees, and flowering crabapples, that were left over after the normal transplanting season, were treated with Geon 31X. In this experiment the survival was from 25-50% higher in the treated than in the untreated. It was found that there was a cessation of growth in the treated plants. This cessation of growth was not permanent and it only retarded growth temporarily. When growth did recur, it was better than in the untreated plants. This cessation of growth was caused by a reduction of respiration as well as a physical barrier around the buds. Evergreens at several nurseries were treated for protection from winter injury. There was less winter burn on treated plants than untreated. This was especially true with *Taxus*.

This work was done in 1947 and '48 and today many commercial growers are using this material with excellent results. In talking with several nurserymen some of them are not having the results they should have. There are several possible reasons why good results are not being obtained. If proper coverage is not obtained, drying out will still occur and the material will peel off more easily. To insure good coverage a wetting agent should be used. We used sodium laurel sulphate (Dreft) as a wetting agent and sprayed to incipient run-off. In addition both lower and upper side of the foliage should be sprayed. If the material is used when temperatures are below 40° F., or if the material is frozen in storage or shipment it will crystalize and not form a good film.

In later experiments, Dr. Hanmer found that when 2,4-D was incorporated with this latex, grasses were killed which are tolerant of 2,4-D. If sprayers are not cleaned out properly toxic effects may occur when using this latex. These are some of the reasons for failure.

I understand that Dr. Snyder is trying several anti-desiccants on the rooting of cuttings. Professor O'Rourke used Geon Latex at Michigan State without too much success in increasing precentage or speed of rooting. We recently had a graduate student at the University of Illinois who tried Geon Latex with other anti-desiccants on the rooting of cuttings with no increase in rooting.

These anti-desiccants have their place in transplanting, storage of nursery stock, and for protection from winter burn.

Krillium

The next material I would like to discuss is Krillium. I am not going to say too much about Krillium because it has not worked out as well as expected. Several years ago, Krillium was in the limelight

and was tried on many crops. Krillium is a cementing agent for soils which improves the soil structure and increases the aggregation and gives better aeration and drainage. This was proven on problem soils especially on clays and other heavy soils. It gave fair results; however, just as good a results were obtained with the use of manure, peat, and other organic soil additives. Since organic matter produces the same results, this material has gone by the wayside. I doubt if Krilliu can be purchased today. We had one worker who was interested in Krillium and tried to obtain some and had a difficult time locating a source of supply.

Transplantone

Transplantone is another material that was used in transplanting several years ago. Transplantone is an auxin solution that the roots are dipped in prior to transplanting and is supposed to aid in root development. This material worked with tomatoes and other tender annuals, however, the results were insufficient for general use. It did not prove satisfactory on nursery stock. There was very little information on this material in the scientific literature. I have never worked with this material myself and will leave it with these comments, as it is probably another one of the materials that should be investigated more thoroughly to see if it will aid in the transplanting of nursery stock.

Aqua Gro

One of the newest materials that has come on the market is Aqua Gro which is a non-ionic wetting agent or an organic wetting agent. Again, there is very little information in the scientific literature about Aqua Gro, and we have to go on the commercial recommendations of the manufacturer. I do have a letter from the Aquatrols Corporation of America and they state that there are several pieces of research work being conducted at various universities. Dr. Boodley of Cornell Universiy is working with this material on transplanting from peat pots. Dr. Widmoyer of Connecticut University is working with container grown nursery stock and Mr. Robert Nuss of Penn State University is also working on container production and found that 50% less water is needed to maintain plants. Possibly, these workers from these institutions could give more detailed information than I am able to give you. These non-ionic wetting agents are supposed to give better penetration of water. This has been proven through the U.S.D.A. Soil Conservation Service. Soils that have been treated with a wetting agent would wet deeper and give better drainage and maintain a more uniform soil moisture. These results would give a more uniform and faster establishment of plants.

The only comment that I can make on this material either pro or con is that we are running into a lot of problems with our water today because of our sewage and drainage systems. We are building up a considerable amount of detergents which are not removed in filtration or other water purification methods. These detergents are contaminating our water supply. This is especially true when using city water from reservoirs. Actually all detergents are wetting agents and in the future we may have enough naturally in our water supply.

Hexadecanol

As I mentioned previously, the one main reason that I accepted this talk earlier, is that I thought I would have some information that would be of value on transplanting. At the University of Illinois, we have been working with a new material called Hexadecanol. This material did show a lot of promise in original experiments. Dr. Roberts of the Illinois Water Survey found that hexadecanol which is a fatty alcohol, would reduce evaporation on a water surface. What this fatty alcohol does is form a mono-layer over the water surface and prevents evaporation. The Botany Department at the University of Illinois became interested in this new material and found that it would reduce the amount of evaporation at the soil surface. They conducted experiments with turf grass with excellent results. The Agronomy Department found it worked with corn and we set up experiments with hexadecanol on ornamentals in the Ornamental Horticulture Division. Our original experiments were on Carnations, Snap Dragons and Coleus. At first we used a straight greenhouse soil and we did not have the results that were previously reported. We then switched to a peat-perlite mix to obtain a uniform mixture that could be easily controlled. This did give us excellent results and we reduced the rate of transpiration by 25%. In addition to reducing transpiration, the evaporation from the container was reduced from 15% to 19% depending upon the type of container used. This was excellent and we thought that we had something worthwhile, so when Dr. Mahlstede asked me to appear on this program I said I would be most happy to since I thought we would have something new to report. However, when we further analyzed the data, we found our fresh weight was the same irregardless of treatment and when we measured our dry weights, we found the treated to be less than the controls. In other words, we actually had a reduction in total growth and therefore we cannot recommend this material at this time. We are continuing our experiments with this material since we feel it still has potential since this material is applied to the soil and the material is taken up by the roots and does reduce transpiration.

Our Botany Department has had excellent results on turf grass, and they have had one student obtain his Ph.D. degree working with this material and it has worked on corn. However, in our greenhouse control cultures, we did not obtain the results that were attained with corn or grass since we had a reduction in dry weight. At this time we cannot recommend this material, but these fatty alcohols have good potential if one can be found that would reduce transpiration without decreasing growth. This process would be much simpler than spraying plants with an anti-desiccant since you are able to treat the soil instead of spraying the plants as you do with anti-desiccants. *This material will be especially helpful in* container grown nursery stock, since watering is a constant problem with container grown stock. We have experiments underway but do not have any results to date, and do not anticipate any striking results due to the outcome of our earlier work. Since we are running behind time I will close

with these remarks, and I will be glad to answer any questions in the discussion period after the next speaker.

MODERATOR GALLE: Our next discussion on Root Pruning, Mudding, Fertilization, will be given by Ralph Shugert, Neosho Nurseries, Neosho, Missouri.

ROOT PRUNING, MUDDING, FERTILIZATION

RALPH SHUGERT
Neosho Nurseries Company
Neosho, Missouri

It is indeed a very great pleasure to appear on this year's program. John Mahlstede has given me a triple-barrelled topic, so we shall approach them one at a time.

In giving some thought to this paper, I reviewed all the back issues of our Society Proceedings, that are in my library. On the topic of Root Pruning there undoubtedly is a diversity of opinion. At our meeting in 1956, after Bill Flemer presented his paper on "Propagation of *Sophora japonica* by Budding," he was asked by Mr. Carl Kern, "I understand that the roots of *Sophora* trees grow straight down, like the horseradish. If permitted to grow in the nursery, the main root will go three or four feet straight down. Therefore, root pruning is necessary." Bill's answer was, "It is true they have deep taproots. Our experience has been that we get better growth if we dig the *Sophora* as two-year-old trees and actually tranplant them, than if we merely run a blade under them and leave them where they are. The same thing is true of honeylocust trees. I think Jack Siebenthaler will agree. If you run the blade under them, it glazes the ground or something underneath the tree, and they stand still and refuse to grow; whereas, if you transplant them and prune them severely with the shears, they grow much more rapidly." Those of us who have grown *Sophora,* and other plants with a comparable root structure, will readily agree. We know that the majority of the coniferous seedling growers will run their digger under two and three year seed beds of *Pinus, Picea,* etc., (with the lifters off the digger) to initiate fibrous root development. Without question this fiber root system reduces transplant shock and will benefit many plant varieties. Another value of root pruning is, of course, the stimulation of flower buds. A good point in question would be that of *Wisteria*—in many cases a good root pruning will force a *Wisteria* into a prolific blooming plant. Just a few varieties that have been mentioned in our own proceedings in the light of root pruning have been *Cotoneaster* (1956), Pfitzer Juniper (1959), and Dogwood (1959). My own personal conviction is that most nurseries should be doing more root pruning than is being done.. Perhaps this could be summed up well by referring to the 1956 proceedings when Harold Hicks asked Case Hoogendoorn this question, "Do you think it is better to trim the roots of Junipers and try to get new growth in the spring, or would you plant them earlier in the spring if you could, or would you pre-