

side branches. Cut on both sides. Last year we used rubber bands for tying, but they don't rot quickly enough so we are going to tie again with waxed cotton.

Our greenhouse bench is 45" wide and 13" deep and we heel in the grafts in about 8" of Canadian peat. Damp the peat just wet enough that by squeezing it hard, a couple of drops of water come out. We get 50 to 60 grafts in a row, and the rows we have about 8" apart so we can wet the peat-moss when it becomes dry without wetting the plants. The grafts are heeled in standing straight up with the grafts covered with peat. It takes about 9' of bench space for the 500. We keep the greenhouse temperature at 60-65° and on sunny days cover the grafts with newspapers. We wet every once in a while. The greenhouse is shaded by that time with white lead and gasoline which we spray on as it sticks better than anything we know. We leave them in the greenhouse 5 or 6 weeks so scion and understock are grown together.

The first week in May we like to take them out of the greenhouse and plant them outside in a bed, after cutting off about half of the understock and putting the grafts under. The bed is 6' wide and we plant the grafts 5" by 5" so it takes about 15' of bed. The understock is planted towards the outside of the bed. The bed is covered with shades and for the first 3 or 4 weeks, the shades covered with burlap. About the end of August or beginning of September the rest of the understock is cut off and the shades removed. The first winter they are covered with salt hay. From this spring's grafts, of the 500 grafted, 312 are growing. It should be more, but last spring we could not get the understock until the middle of April and we had July weather in April and May and the grafts were planted out the first week in May and were not grown together well enough. Two years ago we sold 480 1-year-olds of the 500 grafted. Last year we had the understock in the fall and cleaned them for grafting and heeled them in outside. In the spring most of the roots were rotted. I hoped that they would make new roots in the bench, but they kept on rotting and the end was that only 12 survived. The usual stand we have is 70-85%.

MODERATOR HILLENMEYER: Thank you, Mr. Mahlstedt. Our last speaker this morning is Mr. Albert Lowenfels from White Plains, New York, who will speak to us on Plastic for Greenhouses.

## **PLASTICS FOR GREENHOUSES**

ALBERT LOWENFELS

*White Plains, New York*

I was having breakfast this morning with Roy Nordine. I said I was in a very fortunate position, I don't have to think of the fast buck. I have another business, so I can experiment, and in 1947 I built a greenhouse and at that time Polyflex was advertised heavily. I think I saw a house in Columbus, Ohio that had it on. So I covered my greenhouse with Polyflex and in about a year it started to

break down. Then I covered it with other plastics and eventually they not only broke down, but I found that the light doesn't come through the plastic as well as it should. The plastics discolor.

So then I decided to try something else and I saw the ads for Fiberglas and there is an agency in our town. I inquired where I could get it and they said Lord and Burnham, which is a leading greenhouse manufacturer. So I rang up a fellow I know there, who put up the greenhouse for me, and he said, "I won't put it in." In our climate the heavy snow breaks it down. Some of the people that advertise in the trade magazines may not like this, but I am back to glass, and that ends my short remarks.

MODERATOR HILLENMEYER: Thank you, Al.  
We will now have any questions from the floor.

MR. ROLAND DEWILDE: I would like to know whether any attempt has been made to propagate some of these magnolia hybrids? The reason I am asking this is because we have tried to propagate these hybrids from cuttings, and we haven't got to first base from the standpoint of getting a commercial stand.

MRS. DORIS STONE (Brooklyn): I am sorry I am not the person to answer this because we haven't propagated any. We are just watching our hybrids to see what happens, for as the previous speaker said, some of them may be just nice little puppies, and I don't know what they are going to grow into.

I know at the National Arboretum, and Dr. March is here, they have propagated Freeman variety with great success. Maybe he would like to answer that question.

DR. SYLVESTER G. MARCH (National Arboretum): We have propagated Freeman hybrids, using cuttings from young plants. We find this is the key to the whole problem. If a cutting is taken from the original tree, the results are very poor. It is a matter of getting some of the original cuttings to root and then to take your cuttings from the young juvenile plants. This past year we distributed over 100 plants of the Magnolia Freeman selection.

QUESTION: Any grafting success?

DR. MARCH: No, we haven't had. I think people have tried and without much success, but if you can root a plant from cuttings this is much better than a grafted plant.

MR. PETER VERMEULEN: How are your cuttings treated?

DR. MARCH: The cuttings are taken when semi-hard, dipped in Hormodin 3, and placed under mist for a period of about eight weeks.

MR. CASE HOOGENDOORN (Newport, R.I.): I would like to ask Mr. Bailey about the rooted cuttings of *Prunus triloba* and *cisterna*. You put these in a controlled cold storage and in the spring you took them out and planted them. What I would like to know, do you take them straight from the storage and plant them direct, or do you have them around in a warmer place for a few days before you plant them?

MR. VINCENT BAILEY: Case, we take these direct to the field, right out of the cold storage, which is at 34 degrees. Somebody remarked yesterday that these cold storages cost too much money, but I think they are one of the best paying investments a nurseryman can make. We like them and the stock survives.

MR. ART VUYK: I would like to ask Mr. Bailey if you can do the same thing with broad leaf evergreens, like cuttings from holly, and so on.

MR. BAILEY: I don't know. St. Paul is a little too far north and we haven't done any work with the broad leaf evergreens.

MR. VUYK: Were the cuttings of the *Prunus* defoliated before you put them into the cold?

MR. BAILEY: They defoliate naturally. We do not use any chemicals to take the foliage off. We defoliate by cooling the greenhouse down to 32 degrees, and in Minnesota, the St. Paul area, at this time of year they are completely defoliated. These have all been removed from the bench about ten days ago.

MR. RALPH SHUGERT: I would like to know, Vince, what per cent of your *Prunus* were two to three, three to four at the end of the third year — just a rough percentage figure which might help from an economic standpoint.

MR. BAILEY: As I stated, with the two-year-old plants, the majority of the growth is two to three feet.

MR. SHUGERT: About 75 per cent?

MR. BAILEY: No, about 55 to 60% are two to three. There would be some three to four and some 18 to 24 inch in the two-year block. The three year block will have some four to five but the majority of them will be three to four perhaps 60 per cent three to four, and then of course, the two to three.

MR. PETER VERMEULEN: I would like to ask Mr. Mahlstedde on his grafting of the spruce to go over again the selection of the scion and also when you cut off the understock.

MR. CASE MAHLSTEDDE: We cut the scions from big trees, we imported about 35 years ago from Holland.

When we plant the grafts out, we cut off about half the understock. This year it was the first week in September when we cut it off.

MR. PETER VERMEULEN: Just one more question. You say you selected scions from old trees, but the type of scion you collected was current year's flush of growth or did you try to use one-year wood?

MR. CASE MAHLSTEDDE: We used very old wood. It was heavier. When we can't find enough one-year old wood, we go to two-years, with the top and side branches.

MR. CASE HOOGENDOORN: Do you find any difference in the date when you use one year old or two year old?

MR. CASE MAHLSTEDDE: No.

MR. MARTIN VAN HOF: May I ask Mr. Mahlstedde this? Do you get growth from the terminal bud? Do they do well?

MR. MAHLSTEDE: The first year there is probably about three or four inches growth.

MR. VAN HOF: The terminal bud?

MR. CASE MAHLSTEDE: The terminal bud breaks, but I did not count them.

MR. McDANIEL: Are the scions taken in March from outdoors?

MR. CASE MAHLSTEDE: I graft the middle of March. This year it was the middle of April.

MR. JAMES WELLS: I would like to ask Mr. Mahlstedte if he has done any work on the depth of cut made on the scion and understock in relation to the percentage of stand.

MR. CASE MAHLSTEDE: Well, we don't cut very deep in the scions, especially the outside cut on the scion is very light. We don't cut through the middle of the scion, the heart, at all.

MR. WELLS: I asked this question because I recall some tests we did at Hills some years ago in which it seemed to us that the very lightest and shallowest cut on both sides of the scion greatly improved the percentage take, but the depth of the cut made on the understock was not critical. Again, I think it is wise not to cut really deeply into the stem of the understock, but it was apparently much more critical in regard to the depth of the cut made on the scion.

This is not easy to do on a spruce because of the resins in the wood — you have to keep on cleaning your knife. You have to have a knife that is extremely sharp. The whole thing is a meticulous, individual task, not one for assembly line work.

MR. HANS HESS: I am sorry, Mr. Mahlstedte, that I am not quite clear on how you handle the grafts after you prune them in the peat moss. What did you do to them? You said you put newspaper over them. Is that correct?

MR. CASE MAHLSTEDE: The greenhouse is shaded heavily, but when the sun is bright and hot, we put newspapers over the glass.

MR. HANS HESS: When it is cloudy you remove the newspaper and only put it on when it is sunny?

MR. CASE MAHLSTEDE: : That is right.

MR. RALPH CRAWFORD: I would like to ask Mr. Bailey whether there are any disease problems involved?

MR. VINCENT BAILEY: The question as I understand it, is, Are there any disease problems involved in the production of softwood cuttings? I presume he refers to *Prunus* specifically. Yes, of course, there are disease problems. Sanitation is very important. I take it for granted that we all understand there are sanitation problems that are necessary.

We use some fumigation. I can't tell you the exact material now, but I might say that we replace the sand just before the placing of all of our softwood cuttings. The clean sand we think starts us off with a sanitary condition.

MR. CASE HOOGENDOORN: You don't use any outdoor frames at all.

MR. BAILEY: Yes, we do. We propagate some of the easier to root items outside in mist beds. The *Prunus* are a little harder to root, at least for us, so we put them in the greenhouse. The 64 percent I mentioned that were rooted this year is not something we are particularly proud of. I know it can be improved upon and we are going to improve upon it, but the way we will improve it will be in more attention paid to the age of the cutting itself. We feel that the growth was too soft on some of the cuttings this year.

MR. RALPH SHUGERT: I would like to have Roy Nordine explain to me the difference between the so-called Armstrong juniper and the plitzer nana. How do they differ?

MR. NORDINE: They are in all respects very similar. Just referring back again to the pictures I showed you of various blue forms of *Juniperus horizontalis glauca*, *felicinus minimus*, Gray Carpet, and what have you. They come to us under different names. This is an old nursery practice.

At the present time they look very, very similar.

MR. PETER VERMEULEN: I would like to ask you once more, Mr. Mahlstedt about the position of the graft once it is placed in the trench. You said upright.

MR. CASE MAHLSTEDT: The graft is upright.

MR. PETER VERMEULEN: Is the position critical? Could the graft be laid down.

MR. MAHLSTEDT: I think when you lay the graft down you couldn't water in between there when it is dry.

MODERATOR HILLENMEYER: I would like to recognize Dr. Jim Kelley from the University of Kentucky. He did all the work on this program. I just stood up here and made the introductions on the work he performed. I would like to thank Dr. Kelley for the program this morning.

I think Dr. Snyder has some announcements.

PRESIDENT SNYDER: Thank you very much, Don. I certainly want to add the appreciation of the Executive Committee, the Chairman of the Program Committee, John Mahlstedt, and myself for the excellent program. The planning was well done and each and every speaker was very good and held to time. I think that is one thing that is remarkable about this meeting, more so than our previous meetings, that we have stayed on schedule and without hurrying too much.

The tour, as Louis Vanderbrook told you, is being modified because of excessive snow in Dayton and Louisville. We will expand the tour of nurseries here so you will get a full afternoon.

Again, 8:00 o'clock tonight for the question box.

We stand adjourned.

(The session recessed at 12:30 o'clock.)

RECESSED