

PRESIDENT WELLS: We do not measure it either.

CHAIRMAN MEAHL: It is time that we continue with the next method of propagating magnolias. If there are further questions, bring them up later in this discussion or save them for the Plant Propagation Question Box tonight. Propagation of magnolias by seeds and by cuttings have been discussed, now it is time to turn our attention to the use of grafting in magnolia propagation. A very experienced gentleman is going to give us the benefit of his experience, Mr. Charles Hess of the Hess' Nurseries, Mountain View, New Jersey.

Mr. Charles Hess' presented his paper, entitled "Magnolias from Grafts." (Applause)

## Magnolias From Grafts

CHARLES HESS

*Hess' Nursery, Mountain View, N.J.*

Before going into grafting, I think the first thing to discuss is the growing of the proper understocks. We have found in our experience that *Magnolia Kobus* is the most outstanding understock for all Oriental varieties of magnolias. It is easy to grow and makes a wonderful root system, however, our biggest problem has been to get good seed from the Orient. It is only occasionally that we get seed which has been properly handled. In our experience with *Magnolia Kobus*, once the seed dries out it loses its germination power. One year we had a bed of seeds from Japan which gave us about a five percent stand the first year, but an excellent stand the second year. It also came up the third, fourth, and fifth year after we planted the seed. I am not able to explain why, but we have found that unless we could get Japanese seed early in the fall and have it packed in damp peat moss, it just will not germinate.

Years ago, we planted our own *M. Kobus* with the idea of growing our own seed. We have, at the present time, about ten specimen plants, which will average thirty feet or more in height and ten to fifteen inches in diameter. Really *Magnolia Kobus* makes a beautiful tree and I am surprised that it is not used more for a medium sized tree in landscape work. It is really a sight worth looking at. Not only are the flowers very beautiful but they have a very distinct odor, something most magnolias do not have. Also it has distinctive fall color of the leaves and the seed pods.

The trouble with growing your own seed of *M. Kobus* is that it blooms very early in the spring, about the same time as *M. Stellata*, and we get a crop only about once in five years. As a rule the flowers get damaged by late spring frost, however, we have bought some Hy-Lo oil-burning salamanders which we are going to use around the magnolia trees when they are in bloom. These salamanders are used extensively in California for protection of the citrus fruit crop. How much success we will have with this I am not certain.

Going back to *M. Kobus*, after the seed is ripe we pick the pods just before they start to open and put them in the greenhouse on a bench in the sun. The pods will open in a few days and the seeds will drop out. We extract the seed from the pods and then ferment them in water for about a week or ten days. The pulp of magnolia seed is very oily and it takes a little while to get this pulp off. I will say that the odor is not too agreeable. After this has fermented, the seed is washed, dried, and then immediately stratified or planted. We normally plant about half of our seeds in the fall and stratify the rest to plant in the spring.

This past spring we had three months of rain and we lost ninety percent of our fall sown magnolia seed, however, we were fortunate to have a quantity of stratified seed. These were planted in the spring and gave us a very good stand. We plant the seed in rows in the field from twelve to fifteen inches apart, or in beds six to eight inches apart. We have to be careful not to plant the seed too close because *Magnolia Kobus* grows very fast, and unless they have room, the seedlings will not make grafting size the first year. However if they are planted with plenty of room most of the seedlings will make beautiful stock the first year. Those that do not make size the first year are transplanted in the fall and carried over until the second year. We found one year, when our stand came up too thick, that we could transplant them in the middle of the summer, without any losses. We just took them out, planted them, and never lost one. I did not know that *M. Kobus* was so tough.

We prefer to use *Magnolia acuminata* for grafting the American species of magnolia. We have found that the native magnolias do much better if grown on native stock. *Magnolia cordata*, the yellow cucumber tree, will take on *M. Kobus* but does much better on *M. acuminata*. Of course, if you plant the union underground, the plant will eventually get on its own roots.

In the fall we pot *Magnolia Kobus* before a heavy frost, since we have found that by potting them while the leaves are still on, the plant will re-root in two to three weeks. However, once they become dormant and lose their leaves, it is almost impossible to get them to root until late in the winter. We like to have the understock well established before grafting time.

Another thing to consider is that unless *M. Kobus* is grafted early it will come into leaf in the grafting case, and if it ever does, you are in for trouble. For this reason, we pot them early and we graft them early. We like to graft magnolias in December.

*Magnolia acuminata* will make a very good understock for the Oriental magnolias, however it possesses a coarse root system. Compared with *M. Kobus*, *M. acuminata* is difficult to transplant. *M. Kobus* comes into growth late in the spring and is excellent for late grafting. One thing we have found about *M. acuminata* is that the only satisfactory way to grow it is in pots for an entire year, thereby getting a good pot-ball before grafting. A satisfactory pot-ball cannot be obtained if they are potted in the fall and grafted the same season.



We have found that it does not make any difference what type of graft is used. As long as the graft is well made, either a side or a veneer graft is satisfactory. We use rubber bands at the present time for grafting magnolias, but in the past we have used waxed string. We found that the string would rot before shipping season and it was necessary to retie them. We do advise the customer to take off the rubber bands because they will not rot if planted below soil level.

In taking off the rubber bands, a little care should be used so that the union does not come loose. With rough handling some of the grafts may break because by the time the graft is planted the scion has made about six inches of new growth and, with the big foliage, the plant is top heavy.

After the grafts are made, they are put in the cases and the cases are kept closed for a week to ten days. The grafts are then given a little air by taking the sash off entirely for an hour or so each morning. The time the sash is off is gradually increased. After the fourth week, we block the sash during the evening, take them off in the morning, and then close them during the day. Eventually we block them day and night. At the end of six weeks the sash is taken off and the grafts are ready to be taken from the case. When we take them out of the case, we cut off the biggest part of the understock, leaving only one leaf to help the understock re-root. Early in March we cut off the balance of the understock and give the plants plenty of room so that they will be ready for shipment in May.

We have found that with certain varieties almost one hundred percent of the grafts are successful. With some varieties, however, loss occurs after removal from the grafting case. We have frequently had a 25 to 35 percent loss with *M. Lennei*. During the past few years we have had better results with *M. Lennei* using some two year-old wood. We have also waxed the grafts and placed them on an open bench rather than in the grafting case. Although I do not like to use wax, the method has been successful and after all that is what counts.

In closing I would like to say that a great deal of *M. Soulangeana nigra* which is being sold is *M. liliflora*. Young plants of *M. liliflora* in our part of New Jersey freeze back year after year. It is an entirely different plant compared with the true *nigra*. Years ago, we obtained some true *nigra* from Holland. It is as hardy as *M. Soulangeana* and we like it because it blooms so much later. The flowers are very seldom, if ever, hurt by late frost.

At the present time we have under trial a *Magnolia Soulangeana* which blooms two weeks or more later than the regular *M. Soulangeana*. It has never been hurt by a late frost. The original specimen plant is located on a private estate. Don't ask me if we have any stock, we only have one plant at the present time. As soon as we know more about it we shall propagate it and put it on the market. If this plant will do as well under cultivation in our nursery as it has on the private estate, I think we have a magnolia of considerable value.

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MR. JOHN VERMEULEN (Neshanic Station, N.J.): What is the advantage of grafting over cuttings?

MR. HESS: For one thing, I have personal reasons. I have a hobby of fishing in the summer time. I don't want my house full of cuttings in the summer. If I graft, then I can go away after my spring season. Another reason for grafting is that certain varieties do better from grafts.

MR. VERMEULEN: First you have to grow a plant for a whole year before you are ready to start. You are always grafting in the greenhouse just like I have rooted plants in the greenhouse, so you don't gain space. You have the trouble of growing the stock a full year before you are ready to graft. I take cuttings in June or July, and they are ready for sale in the spring. I save a whole year and don't waste any time. I also root *M. Soulangeana Lennei* up to 80 per cent and I think that any time you can get this percent you are doing all right.

MR. HESS: With *Lennei*, we have no trouble getting the grafts to unite but we have had a heavy mortality after they come out of the case. We have found that if you use a side graft there is less loss. Also this year we have used mist and grafted in the open bench. We had practically 100 percent stand with *Lennei* in the open bench. The only thing I object to in waxing is that if there is a hot period in the summer, with temperatures of about 100, the wax will melt and burning will occur. However if they are kept in the shade for a year the wax will have peeled off. But the important thing is that when you use wax keep them in the shade.

MR. JACK SIEBENTHALER (The Siebenthaler Company, Dayton, Ohio): Mr. Hess, I would like a discussion on the use of the intermediate method of injecting a shield for your late blooming *M. Soulangeana*.

MR. HESS: I am very interested in this. That is one of the things that comes out of meetings such as this one. I think what this Society ought to do is have a medal made and give it once a year to a man who has done something outstanding. Mr. Nicolin certainly should have one because this technique is really something new.

MR. RICHARD FILLMORE: Well, I think he should have a medal because so far as I know it would be the second genuinely new budding technique in about 1,000 years. The original budding method was probably worked out 1,000 or more years ago and it was perhaps fifty or sixty years ago that the patch budding method was developed for propagating nut trees on the Pacific Coast. I would like to have someone who knows more about budding than I do go through the literature and see if this is genuinely true.

MR. HOOGENDOORN: Mr. Hess, do you bury the graft union?

MR. HESS: Not in magnolias. In certain types of grafting we do bury the union. The reason we did bury the unions years ago when we first started grafting was that we waxed the union. Now we don't wax. We found that the main thing which has given us trouble was damping off.



When we give more air by keeping our cases blocked in the daytime, we have much less damping off and do not have to wax the unions. It has been a great help in biotas and certain junipers.

MR. HOOGENDOORN: Did you say that you grafted *Lenneis* on an open bench?

MR. HESS: Yes, with perfect success.

MR. HOOGENDOORN: Without waxing them?

MR. HESS: We used to cut the scions and wax them before grafting. Now we graft them and dip the plant. However the wax at the bottom of the container is considerably hotter than at the top and the top of the scion may be burned. This doesn't show up immediately. It is necessary to be fairly careful that the wax is not too hot. It is necessary to use a wax that melts at a low temperature.

PRESIDENT WELLS. I would like to add a couple of comments to this discussion. We have used open bench grafting quite successfully on a wide variety of plants. We wax everything that is dormant and has no leaves. We cut off the dogwood understock, graft on the stump, dip into the wax, and set on the open bench. The same is true with maples. On conifers, such as biotas, *Cedrus atlantica glauca*, and *Cryptomeria*, we do not wax but bury in peat in the open bench. All were equally successful. The only requirement is a constant, even temperature in the bench so that callus formation is constant and rapid.

Coming to just one other comment on the over-wintering of magnolia cuttings, we come back, inevitably, to constant mist. If the cuttings are taken early enough, they can be potted early enough in the summer to get them well established in the pots and to secure new growth. This is the important factor. Then they will come through the winter without any trouble in an ordinary frame which is adequately protected against violent fluctuations of temperature.

MR. HESS: As I mentioned in my paper, five years ago we got a quantity of seeds of *Magnolia Kobus* from Japan which was shipped in the usual dry way. We planted the seed and got about five percent germination. As we dumped those seedlings out in the fall, we happened to examine the seed and found that they were still alive. So we recovered the bed. The next spring we had about eighty percent stand. That was the second year. It continued to germinate for five years. I wonder if Professor Meahl will explain what happened to the seed?

CHAIRMAN MEAHL: It must have gone into a very long secondary dormancy. It has been reported that these seed will go into a secondary dormancy, however, that was an extremely long one.

MR. RICHARD FILLMORE: I can't explain it, but I was told quite a few years ago that if you wanted to be sure to get all the magnolia seedlings possible from a group of seed that the seeds should be sown in the same bed every year.

MR. HESS: With our own seed we normally get a few coming up the second year, but I never had it come up five years later.

MR. FRED GALLE: In a report in the arboretum bulletin from the University of Washington, the same thing is mentioned. Seed from two specimens germinated the second year, and in another case seed germinated over a three-year period.

MR. LESLIE HANCOCK: Mr. Chairman, at the risk of being a diversionary, may I say that I am surprised that we haven't discussed the layering of magnolia. I know very little about magnolia propagation, in fact, nothing at all. I thought that I would find out about it when I visited in Boskoop in 1948. There I saw long, leafless shoots of magnolia bent over to the ground and layered. I thought that looked very wonderful but probably costly. At home, I had six or seven large specimens of *Magnolia Soulangeana nigra* which had produced a lot of young shoots from the base and were unsalable for plantings. I thought to myself why not just lay those shoots along the ground. I prepared some wires and wired them down to the ground. There was a very solid row of one year or two year shoots along the ground. I did that in the early spring and thought I would leave them there until the young shoots started to grow. Gradually, as they grew, I piled soil around them and at the end of one year there were a few roots. I left them one more year, and from those six or seven plants, I took nearly 1,000 rooted layers. Every single shoot that grew up that had been properly handled produced a plant. Now this being so, it all seems rather curious to me why we have gone to such lengths to produce magnolias by grafting and cuttings.

MR. HESS: If you want mass production you have to use either grafting or cuttings. Another layering method—mounding—is used in Chase, Alabama. To produce ten or twenty thousand magnolias by layering it would be necessary to have a whale of a lot of stock plants. If you want mass production as was mentioned for the Mobile area—two and a half million cuttings a year—layering is too slow a process.

MR. FLEMER: I would like to comment further on open bench grafting. By knowing that we are going to abandon the waxing in the grafting of magnolia, beech, and red maples, we simply cut off the stock and graft with a long slender union onto the scion, set the pots closely on the bench, and cover with four inches of peat. We get wonderful results.

MR. HESS: We don't put our maples in a case. We don't even wax them, and we have done away with glass.

MR. FLEMER: It cuts down on the fungus.

MR. HESS: If we were to use in our propagation the grafting methods of forty years ago, we would have a 100 percent loss. It doesn't work. In Boskoop today, they can't do what they did forty years ago. For example, they have trouble in grafting hemlocks. Why, I don't know.

CHAIRMAN MEAHL: If there are no further questions nor comments, I will turn the meeting back to President Wells.

**PRESIDENT WELLS:** Thank you, Professor Meahl, and thank you very much Fred Galle, Tom Dodd, and Charlie Hess. I would just like to say that the meeting this evening will start promptly at 8:00 p.m. I can see there is going to be a lot of discussion this evening so we want to start on time.

The session recessed at 4:00 o'clock.

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## **PLANT PROPAGATION QUESTION BOX**

**Friday Evening, December 11, 1953**

The Question Box session proved to be quite an interesting meeting. More than thirty-five questions, submitted prior to the session, were discussed. This was followed by a series of very interesting slides. It was decided, however, to omit the transcription of this session because of the length of the proceedings.

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