The Grafting of Viburnum

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We graft Viburnum and do both winter and summer grafting and will start to discuss the understock we use for grafting.

We graft Virburnum and use nothing but Viburnum Dentatum for understock and only use Viburnum Lantana when we cannot get enough Dentatum.

However, in the past we experienced considerable trouble with black spot and leaf drop in the foliage of Viburnum Carlesi.

Years ago in Holland we used nothing else but Viburnum Lantana for understock so after I came over, continued to use Lantana for understock.

Finally about 1930 we tried Dentatum as an understock and discovered that we were getting just as good a growth and were not bothered half as much with black spot and leaf drop.

Since then we have always used Viburnum Dentatum as an understock except when we cannot get enough Dentatum.

I know that a lot of people object to grafted Viburnum and complain about suckering and they are fully justified in a good many cases. In order to overcome that, we use nothing but nursery grown Viburnum Dentatum, one or two years old and de-eye all understock (especially around the neck of the root) before potting. We have never used collected Viburnum Dentatum. We've looked into that when nursery grown seedlings were sometimes unavailable but the samples we received at various times showed they were mostly suckers and loaded with sucker eyes all the way through the roots. We have skipped grafting Viburnum in some years rather than graft on collected stock.

No doubt, a lot of people have a good reason to complain about suckers on grafted or budded Viburnum if they bought them from a careless propagator or grower who did not go to the trouble of de-eying his understock.

We take most of our grafted Viburnum and plant them in a bed for one year before we sell or line them over the field. When we dig them from the bed, we look them over very carefully again for suckers. We may find a few small suckers (and it is only a few) which were too small to see or were skipped in the de-eying process. After that we line them over the field to grow into saleable plants and whether we have them for two or three years or more in the block, we very rarely find any more suckers. I hope that this explanation will do away with a lot of the prejudice many people have against grafted Viburnum. Just buy them from a conscientious nurseryman and you will be alright.

I realize that I have gone way ahead of myself as I still have not told you anything about grafting.

We pot all of our understock in good potting soil with some sand and peat mixed in it to prevent the soil from getting sour in the pot.

About the middle of October we pot up our understock for winter

grafting. If you can keep the foliage on for some time, they will reroot very readily which is preferred. If you do it too late or too early, the leaves will drop soon after potting and then they will not start rerooting until February when you get action again in the tops.

When we graft them we leave the tops on and use a side graft and then put them in the sweat bench with the unions buried in damp peat moss. As you all know, a sweat bench or just as often called a grafting bench in a greenhouse is covered with sash on top of the bench.

After the grafts are in this grafting bench, they have to be watched very carefully. Viburnums do not like excessive humidity so the first thing we do every morning is to hang up the sashes and drain off all the excess humidity which collects on the glass. Then we leave them open for ten or fifteen minutes and as they progress, we extend this airing period. During the hottest part of the day when the sun is out, we roll thin linen over the glass for shading.

Viburnums react very quickly under glass and in about ten days we put a two inch stick under each sash and carry air on them continuously. We have learned through sad experience that Viburnums do not like too much heat and the more they progress, the more air we give them. That way they are well hardened off by the time they are fully united and ready to be taken out of the bench. We have had a lot of trouble while they were in the grafting bench because after a while, we got a swelling at the terminal of the scion and they would split right down. This, in turn, dried out the scion and just killed that graft.

At first when we did not know this, we had severe losses that way especially when we grafted them in March when the greenhouses were getting pretty hot. So after that we have always grafted them in our first batch of grafts around New Year which is the coolest part of the winter in the greenhouse. We have overcome this splitting pretty well by careful watching.

One thing I would like to mention now is that we have never experienced as much trouble with splitting in Viburnum Wrighti, Burkwoodi or Setigerum as we have in Carlesi. We find that Viburnum Carlesi is the most troublesome with this splitting.

Since we have found out that Viburnums do not like too much heat and moisture, we started to experiment with grafting them on an open bench. We bury the union under peat and just throw some papers over them for the first two weeks. Every morning we take these papers off and fog them with a fine spray nozzle and then put the papers back again.

In about two weeeks we get considerable action and most of the scions are breaking by that time. Then we take the papers off altogether. On sunny days we keep fogging them once or twice a day.

Just as soon as most of them are well calloused and united, we set them over and at this time put them on top of the peat in order to harden the callous. We bury again the ones which are not fully united until they are finished up.

The reason for setting these grafts over is a very important one. We have found that once your graft is united and you leave that graft buried in the peat, the callous starts to get watery and turns black and you can lose your grafts just as fast. So you see that no matter whether you

graft in a grafting bench or open bench, your grafts always need careful watching.

Well, that is our experience with winter grafting of Viburnum and as I mentioned in the beginning, we also do summer grafting. This has several advantages which you will notice as I go along.

The plants we graft in the summer are potted up in the spring in April and plunged outside in an open bed. This potted stock is left there until the time we graft them.

We generally graft toward the end of August or in the beginning of September. This depends on when our scions are ready since this is the dominating factor in summer grafting. We have to wait until we find branches which have stopped growing and are sufficiently hardened off. We have found that branches which are growing will wilt and do not callous and will fungus very easily.

I would like to mention now that fungus is your biggest danger in summer grafting and so we take all the precautions we know of to avoid this.

After we plant out all our stock from the greenhouse, we clean them out by carrying out all peat and sand and even cleaning underneath the benches. Then we give them a thorough washing and let them dry out as much as possible. We open all the doors and ventilators in order to get as much air and sun in there as we can. When they are thoroughly aired out we apply a coat of cuprinol to all the benches and leave these houses to air and dry out until we start making cuttings and grafting again. Then we bring in all new sand and peatmoss again and start off a new season. We also put on a coat of whitewash on the glass and shades to try to hold the temperature down as much as possible.

When we bring in our Viburnum stock which we are going to graft from outside, we take a cloth and wipe off all our pots and also the base of the stem. Of course, by the time we graft these summer grafts, the stems are potbound so we cut them off about an inch or more above the pot; just enough so that we can graft on the stub. We take these grafts and put them in our grafting bench under glass and bury the union under damp peatmoss.

Every morning we open up our sashes to drain off all excess moisture and air them for ten or fifteen minutes and again this is increased as the grafts progress. On sunny days we roll the linen over the glass as well.

While we have the bench open, we go over these grafts very thoroughly looking for fungus and also remove any bad leaves we may find. As I mentioned before, in summer grafting fungus is your biggest danger as it will wipe out a batch of grafts in no time. You must always remember that a greenhouse in the summer is hot and humid and this is the ideal condition for fungus growth. But before you get that far, your grafts are a constant worry.

These summer grafts also have their advantages. In the first place, you do not need any fuel. In the second place, a summer graft which has been lined out for one year is a much stronger plant and a freer grower than a winter graft which has been lined out for one year.

The reason for that is, of course, very easy to explain. Your winter

graft has been forced into growth during the winter while you were grafting it and carried in the greenhouse until spring. After it is planted out, it will take time out to rest and will rest for a considerable time before it starts to grow again.

Now you take your summer grafts. It has not been forced into growth while it was grafted. After it was united and ready to get out of the grafting bench, it was taken to an outside cold frame and sash put over it. Then we start to air them again and as time goes along, give them more and more air to harden them off again to get them in shape to withstand the winter.

By late fall they will drop their leaves and go to sleep and rest all winter. When these grafts are planted out in the spring, they will start to grow and grow continuously all summer long as they have had their rest period during the winter. Consequently, you get a stronger growing plant.

Here is one more reason where summer grafting has an advantage. We have grown Viburnum Carlesi from seed for about twenty years (that is, whenever we were able to obtain the seed). Right now we have a considerable number of stock plants anywhere from three to five feet.

Naturally, anything grown from seed will almost always show some variations in foliage and habit of growth, etc. and this is also the case with Viburnum Carlesi.

Since a lot of our stock plants are coming into maturity, we noticed a couple of years ago that there were some outstanding plants among them. By grafting in late summer we have an excellent chance to select these plants to cut scions from.

For instnace, we noted that some plants will hold their foliage much better than others. Some will have nicer foliage than others. There are some that will have larger flowers and some will hold the pink in the flower longer than others. Then again some plants will show a better plant structure and form a better bush. And last, but not least, some plants form flower buds more readily than others and are more persistent budders.

So what we are after now is to gradually get a selective type of Viburnum Carlesi which is a good grower, has good lasting foliage, large flowers and is a persistent budder.

I know this is a mouthful and that is why it will take quite some time before we will be able to work up a stock but I think it is worth the effort.

But what I mainly tried to bring out is that you cannot select scions for foliage in the winter. So here is one more advantage to summer grafting.

CHAIRMAN FILLMORE: Do we have any comments or questions for Mr. Hoogendoorn on "The Grafting of Viburnums?"

DR. HENRY SKINNER (National Arboretum, Washington, D. C.): This may be beside the point. Mr. Hoogendoorn starts from grafting. I wonder if this isn't the logical time to bring up the point as to whether one actually should graft or shouldn't graft Carlesi. That is, on the kinds of stock generally used. The suckering is one point which you made. It seems to me it is logical we might be able to find a non-

suckering stock on which Carlesi should grow as vigorously as it does as a seedling, as was pointed out earlier this afternoon.

I might cite an experience in Philadelphia with a Carlesi which as far as we can tell is up to 30 years old. It was up to 4 feet high once. It was a grafted plant. Now that plant, had it been a seedling at 30 years, I believe should have been possibly in the neighborhood of 10 feet high at least.

MR. HOOGENDOORN: Not necessarily. We have also found slow-growing types among the seedlings. In fact, we have one now. I found it a couple of year ago, which I have called "compact," which is a very compact growing one and makes a beautiful bush and has a large flower.

DR. SKINNER: You will get all variations from possibly dwarfs. You may get vigorous ones and the good types you mentioned. The good types should by all means be selected. I am wondering whether we hadn't better propagate on an improved stock or try some other method.

MR. HOOGENDOORN: Some prefer softwood cuttings in order to reproduce the selected types and we have done that, too. We have grown viburnums grown from soft wood but the cuttings haven't much boost to them. They are very slow-growing plants. So from a commercial point of view, it wouldn't pay us to grow them and we went to grafting where we get a vigorous plant faster.

DR. SKINNER: You have assurance that that plant will be as vigorous.

MR. HOOGENDOORN: Absolutely.

DR. SKINNER: That is the question that is always raised, and I am just wondering how true it is.

MR. HOOGENDOORN: Naturally, if you take a graft from a vigorous plant you will reproduce that vigorous plant, and I have talked with other people at the convention last summer and I passed the same remark. In the first place, it is a battle to root and winter Carlesi from cuttings, and once you have them and they don't grow, it isn't worth the effort. I was talking to a few nurserymen and they had the same experience and they were going to quit just on account of its being so slow-growing. We can grow them faster, so we will stick to grafting.

DR. SKINNER: I might mention just during the past week I received a letter from a European nurseryman coming over this summer, whose main object was to open a market for special types of grafted azaleas and I told him I would be glad to help all I could. I know the gentleman well. I said, "First off, think of a really good reason why you want to sell grafted azaleas in the United States, because that is one question that is going to be asked you."

MR. HOOGENDOORN: That is the hybrid type. If you want to reproduce the same varieties, the only way to reproduce them is graft. He isn't going to have much success trying to graft them in this country.

DR. SKINNER: They have an idea hybrids will only occasionally come from cuttings.

MR. HOOGENDOORN: The trouble we have found with

azaleas is that it is too hot and dry here in July for summer grafting, you think you are cutting a good scion. You put it in the bench and graft it and two days later it will be hard as a rock.

MR. HANCOCK (Cooksville, Ontario): Mr. Chairman and Mr. Speaker, without questioning your judgment that the strong growing variety should be the source for your propagating material, I would like to raise the question whether some of those variations or apparent variations you see in your grafted plants are not due to some special compatibility with that particular seedling which you used for that plant, and if you didn't have it on that stock it would return to just the straight line material. I think you should take into account that when you graft any plant the influence of the stock on the scion is considerable, so you get variations due to the understock, just as in growing a dwarf apple you will get considerable variation because of the understock. This variation would hold good in ornamentals. I would question whether you get anything permanent if you select variable stock.

MR. HOOGENDOORN: Those were selected seedlings.

MR. HANCOCK: I thought you were speaking of the graft material.

MR. HOWARD BURTON (Hill Top Nurseries, Casstown, O): I wish to voice a minority report on your understock and it may be due to the different climate but *Carlesi* grafted or budded on *lantana* makes a vigorous growth and a better plant than on *dentatum* or *molle,* and with no more suckering, really, I don't believe as much suckering. We much prefer *lantana* to *dentatum.* We gave up *dentatum* after a few years' trial.

MR. HOOGENDOORN: We have found *dentatum* is every bit as good. We found when we were grafting *lantana* we had considerable trouble with black spots and leaf spot. With *dentatum* we didn't have half as much. We are using today *dentatum.*

MR. BURTON: The plants side by side would be half the size.

MR. HOOGENDOORN: Again, that might be a question due to soil or climatic conditions. In our neck of the woods we found it the other way, and that is why, after all, you may tell the other fellow how to do a thing or your experience, but that doesn't mean you can go home and do the same thing, where you have a variation in climate and soil.

MR. MARTIN van HOF (Rhode Island Nurseries, Newport, R. I.): To answer that question about the understock, about *dentatum* and *lantana* understock, I could say in our section we are surrounded by salt water. Newport, Rhode Island juts right out. We have black spot not only in the *Carlesi* but we have black spot in the *lantana,* so we dropped the *latana* in order to overcome the black spot in our *Clarlesi,* so we used *dentatum* exclusively. Our growth on *dentatum,* as Case said, is really No. 1. We grow a four-year Carlesi that size and that broad. (three feet by three feet).

MR. KERN: I have heard the remarks made here about black spot with *Viburnum Carlesi.* I don't believe I have ever seen it. One of the most hazardous agents that might come in contact with *viburnum* is sulphur, sulphur dust in any form. Keep sulphur away from any viburnums.

Even the slightest whiff of sulphur dust and black spot shows up in 24 hours.

MR. HOOGENDOORN: What would you use for black spot on viburnum?

MR. KERN: I never had any.

MR. HOOGENDORN: Wonderful. Lucky. (Laughter)

MR. R. M. FISHER (C. R. Burr & Co. Inc., Manchester, Conn.): I think from the plantsman's standpoint, who ultimately uses the plant, *dentatum* is much better. For the ordinary layman it is pretty hard to see the suckers on *lantana* and the first thing you know they have a plant that is all reverted and they will come and ask what it is. Sorry, you got the wrong plant, whereas, in *dentatum* they can at least see the suckers quite readily and take them out.

Another thing about vigor, I think you get the same vigor, in fact I have had the same experience you have had, more vigor with *dentatum,* and of course, we have suckers because we bud ours. I would rather bud them than graft them. We bud them on *dentatum* and the vigor is there.

MR. HOOGENDORN: Don't you de-eye your stock before budding?

MR. FISHER: No. If you get too much soil up around the stock, it seems to want to sprout under the ground surface.

MR. HOOGENDOORN: That is why I prefer grafting, because you can't control your suckers.

MR. FISHER: That is the difficulty with budding.

MR. JACK BLAUW: On your winter grafting, is it necessary to wax the understocks?

MR. HOOGENDOORN: That is what we did in Europe.

MR. BLAUW: We dip them in wax.

MR. HOOGENDOORN: We don't. We tried that, too, but we are getting away from wax inside the greenhouse. We used to wax maples and blue spruce and even then we found you have quite some losses again at the end of March and during April while they were in the greenhouse because the wax draws the heat and I have seen a lot of them dying. We tried waxing magnolias and they would still die at the end of March and April. When it is hot in the greenhouse the wax draws the heat. That is what kills them, so we are getting away from waxing.

MR. BLAUW: We don't have any trouble.

PRESIDENT WELLS: What do you use instead of wax?

MR. HOOGENDOORN: Nothing.

PRESIDENT WELLS: Just bury the union in the peat?

CHAIRMAN FILLMORE: I would like to comment on that. I think a good many people who are waxing and that might include Case, are using too much. If you heat the wax to between 160 and 170 degrees and keep it there and just dip your plant in and out, you will be all right.

If the wax gets any colder and particularly if you have real cold material going in, you are going to get too much wax on. Most of the waxing I see, the plants have been waxed too heavily. I have had splendid results with maples and magnolias by waxing them all over with Parowax. I think you have to control the temperature of the wax or you get too much on.

DR. FRED J. NISBET (Musser Forests, Indiana, Pa.): I wonder if anyone has used any of these compounds made from the Goodrich Latex, such as Plantex, to get away from the dipping of the paraffine and yet holding the moisture within the plant. It would seem like a good opportunity to get something that would go on easier and give you less trouble.

MR. HOOGENDOORN: I don't know.

CHAIRMAN FILLMORE: Any comments on the use of Latex for grafting?

MR. JAMES ILGENFRITZ (Ilgenfritz Nurseries, Inc., Monroe, Michigan): We do have a product which we call Plantex, which is the Goodrich VL600 with a wetting agent. That is what all of them are comprised of.

I would not recommend Plantex for grafting because I believe the preparation is very penetrating and it will enter into the joint, the union, to such an extent that I would hesitate very much to use it.

PRESIDENT WELLS: We had a member of the company come to our nursery a little while ago and suggested to us that we could use that Latex compound and spray it on the grafts after they were completed in flats before they went into the greenhouse as it is sprayed onto the plants out in the open field. We haven't tried it. I felt very doubtful about it. It didn't seem to me that would cover the plant as it should, but maybe we are not right. I think perhaps we should try it. We have tried it; we are trying it at this moment on cuttings, and it does seem to have a place there. That is rather getting off the point of viburnums but it seems to help on rhododendron cuttings.

CHAIRMAN FILLMORE: Any other comments?

MR. MARTIN VAN HOF (Rhode Island Nurseries, Newport): As usual, Case was very thorough in explaining the graft, as he does everything. Whatever he does has to be just so. There is one thing I don't think he brought out in that summary of grafting, and that is the preparation of the peat. I think he skipped that.

MR. HOOGENDOORN: No, I mentioned the viburnum and peat.

MR. VAN HOF: I mean the moisture content of the peat, especially in summer.

MR. HOOGENDOORN: The moisture content should be very, very light, again to fight the fungus.

MR. VAN HOF: Another thing, when he brings them out of the greenhouse—I don't think he mentioned that—in what sort of a frame.

MR. HOOGENDOORN: We put them in a frame with high sides.

CHAIRMAN FILLMORE: Any other comments or questions?

Well, you have heard me speak very briefly about one possible means of rooting and of wintering viburnums. You have heard numerous comments to the effect that not disturbing the plants and permitting them to make secondary root systems will encourage better survival.

You have heard Mr. Kern say that collecting seeds somewhat on the green side will help to ensure quick production of seedlings, especially in the species. Clones, of course, will have to be propagated by some vegetative method. Mr. Hoogendoorn has suggested grafting viburnums both in winter and in summer as a possible means of perpetuating these clones, so one can be assured of having dwarf plants or plants with superior flowers or more flowers, as the case may be.

I would like to say frankly that I have no prejudice against grafted plants. I don't think that we should even work toward trying to produce every plant from cuttings. In many cases, plants on their own roots will be disadvantageous, as in the case of certain commercial peaches in nematode-infested soil, and there are many other similar instances. I think the grafting technique is here to stay.

I believe *Viburnum dentatum* stocks, either from seeds, cuttings, or layers, when properly de-eyed and properly grafted or budded make comparatively satisfactory stocks for *Viburnum Carlesi.* By the time the plants attain two or three feet, at which point they would normally go on the home grounds, if they have been properly handled in the meantime, the chances for serious suckering or deterioration at the union or any other difficulty is relatively slight. I think that concludes the discussion of viburnums unless there are further questions or comments, in which case we would be very glad to have them.

PRESIDENT WELLS: Didn't you want to say something, Mr. Bosley?

MR. PAUL R. BOSLEY (Bosley Nursery, Mentor, Ohio): I was rising to make comment on the use of wax and on the use of the Goodrich spray material. Last year, we used it on azalea. On one group we sprayed the Goodrich material and another group we dipped in wax that I am sure was satisfactorily warm and we got a thin covering. With the wax-dipped material we had probably a 98 or 99 per cent stand that made excellent growth in the field. With the Goodrich material we had noticeable losses, but the losses in the case of the Goodrich material were not nearly as great as the losses we had by the old method of grafting in a closed frame with fungus and other things overtaking the graft, so the Goodrich material stood intermediate between the closed frame and the wax-dipping. That will answer two questions here. We conducted the experiment very carefully.

I would like to ask Mr. Ilgenfritz a question. You made a statement that the Goodrich material had a penetrating effect and that all wax materials being offered were basically Goodrich material. Did I understand you correctly?

MR. ILGENFRITZ: No sir. Goodrich VL-600 is not penetrating of itself but to make it effective in the work where we use it, we put a wetting agent in it. That is true of Plantcoat. It is true of Wiltpruf and Plantex, the three products being offered right now. I believe the wetting agent, such as Santomerse S, will convey some of the material in the cleavages of the joints. That is why I feel outside of experimentation it

should not be attempted for grafting. We had a little experience in our own greenhouse which bears out that feeling. I shouldn't condemn it.

MR. BOSLEY: We used the Goodrich material straight without wetting agents.

MR. ILGENFRITZ: Certainly, you shouldn't have that effect.

MR. Bosley: We used paraffine as a dip.

MR. ILGENFRITZ: If you felt that I said there was any connection between wax dip and Goodrich VL600, I didn't mean to convey that.

MR. BOSLEY: I wanted to know whether you meant to say Goodrich material penetrated the tissues by reason—

MR. ILGENFRITZ (Interrupting): No.

CHAIRMAN FILLMORE: Any other comment? We shall adjourn for this session, then. (Applause)

. . . President Wells resumed the chair . . .

PRESIDENT WELLS: Don't go away, gentelmen. We are not adjourning the meeting.

There seems to be a lot of controversy over this, and Charlie Hess is here and he is "agin" wax for the same reason that Case is "agin" it. Maybe these Dutchmen have got together, but we are using wax and we are using it very successfully, and certainly we get a few losses as recorded in grafting maples. They apparently grow together quite well and make initial growth and then the young growth dies, but nevertheless, it is the best method we have found yet and we are getting much higher percentages than when we were putting the plants in sweat boxes and other confined quarters. We have found that in general the further we can get away from confined quarters the better we get on. Now that is a sweeping generality, and of course, there are exceptions to it, but maybe this evening if we have time—I brought a few slides along to show some experiments we made this summer, propagating right out in the open without any protecting whatever. That is on the other end of the pendulum as against the sweat box, but there is more in this than meets the eye. Just because it sounds a bit hard we shouldn't discard a suggestion. We should try it out because you get some rather astonishing results sometimes.

Well now we come to the second main speaker this afternoon. You all know Chad. No need to introduce him in the normal sense of the word.

I remember the first time I came in contact with Dr. Chadwick I think it was in Philadelphia in 1949 and I heard him give a talk which showed conclusively no matter what we did, if we took a crop of B and B plants off the ground we never could recoup what we lost. He worked it all out in a most remarkable manner, I thought, at the time, a sort of profit and loss account and even if you piled manure on and ground crops you still had a definite loss.

I said to somebody at the meeting, "Who is Dr. Chadwick?"

"Oh," they said, "he is a damn fine fellow. Even if he does work for

a university he is a man of the land and he calls a spade a spade." That was my introduction to him, and I found it a very sound appraisal of him. So, with that, I would like to call upon Dr. Chadwick to give his address. (Applause)

. . . Brief recess . . .

DR. L. C. CHADWICK (Ohio State University): I might say first I am happy to be here and see such a large crowd. I think when we organized this group or meeting last year we had no anticipation that it would increase to such proportions in one year's time.

. . . Dr. Chadwick presented his paper on "The Importance of the Selection of Propagating Wood." (Applause)