

With those few remarks, we will get down now to the main part of the program this afternoon, which is a "Viburnum Round Table," in the beginning.

Now before passing the meeting over to Dick Fillmore, I would just like to introduce him with a couple of words.

I first met Dick some four years ago, at the Arnold Arboretum. He is a quiet sort of person, but we no sooner met than we were into his greenhouse and poking around among plants and one of the first things we talked about was viburnums. Since that time, it has been my pleasure and privilege to extend that first meeting into a friendship which I value and I know him to be one of the very best plantsmen in this country.

Now, it is customary for people introducing someone else, particularly in America, to make some fulsome comments. I don't intend to do that, and what I have said is sincere. Dick Fillmore is well worth listening to, so with that, I would like to introduce Dick Fillmore of the Shenandoah Nursery.

. . . Mr. Richard H. Fillmore, Shenandoah Nursery, Shenandoah, Iowa, took the chair as discussion leader . . .

CHAIRMAN FILLMORE: Mr. President, ladies and gentlemen: I am very glad indeed to have an opportunity of speaking before this Second Annual Meeting of the Plant Propagators Society. I prize Jim Wells' friendship very highly and I am glad to have him recognize that friendship on this occasion.

I feel particularly happy today that we have Mr. Case Hoogendoorn of Newport, Rhode Island, to share the responsibility of this program on the propagation of viburnums. I have said to Mr. Hoogendoorn within the last hour that I wish I had the skill in my hands that he has in his. I am sure that we shall enjoy Mr. Kern's discussion of "The Propagation of Viburnum from Seed." I look forward to that discussion, myself. We are intending to grow viburnums from seed at the Shenandoah Nursery during the coming year and I delayed stratification and other work on those viburnum seeds until such time as I could hear his discussion.

I will speak briefly about the "Propagation of Viburnums from Cuttings," and any discussion of this type, to my mind, should be taken up under four or five general headings.

The first heading would be timing. What time of the year shall we make the cutting?

The second topic would be the type of cutting. What type of cutting shall we make?

The third topic would be, having made the cutting, what sort of a medium shall we put in it?

The fourth topic should be what sort of culture should we give the cuttings after we have finally placed them in that medium.

I am not going to discuss all of these topics. I think that the discussion will include comments and questions which will bring out these various points in more detail than I wish to give to them at this time. I

am going to confine my remarks to the type of cutting in relation to the rooting and survival of the cutting.

First of all I would say that viburnums in general, and many of you folks may not agree with me, are easy plants to root but relatively difficult plants to grow on. That is, they are likely to die following potting or following transplanting, so that having rooted them very successfully, we may find ourselves with nothing but a lot of blackened stumps either three weeks or six months after they have been put in the pot.

It seems to me that the type of cutting has a very great influence on rooting and survival. I have repeatedly made cuttings of *Viburnum Carlesi* and *Viburnum Juddii* out of rapidly growing shoots. They root in three weeks. They die within 3 or 4 weeks of the time they are potted. That is particularly true when the cuttings are made on the early side, in June and July. At the Arnold Arboretum, we had much better success by taking twiggy cuttings of *Viburnum Juddii* and *Viburnum Carlesi*. By the twiggy type of cutting, I mean those twiggy shoots that can be gathered from older plants and which usually have two or three year old wood at the base. Short twiggy shoots root in late July or even early August in the Boston area.

On one occasion, and incidentally, I have not got enough experimental evidence for this method to want to make it universally applicable right away. It needs more experimentation and it is something for you folks to experiment upon if you have the time and the inclination, but in one instance we took 200 cuttings of *Viburnum Juddii*, which is a close relative of *Carlesi*, 125 of those were the tips of shoots, soft tips of shoots such as one would ordinarily regard as being real good cuttings. Practically all of the cuttings of that type which we took died. We did, however, manage to get 37 of those to root. Now with this twiggy type of cutting we got 71 out of 75 to root, the short soft shoot 37 out of 125 and the short twiggy shoot 71 out of 75.

We observed in January the number of potted cuttings which had started and those which had not started. Our idea was that viburnums might follow the pattern of magnolias, for example, which, if they start toward growth, have a much better chance of surviving throughout the winter than those which remain completely dormant. We didn't get any difference with these viburnums. The plants which had started by January did not survive any better, that is in terms of surviving until March or April, than those which had not started by January.

We also tried to determine the importance of the transplanting shock factor. We potted some of these cuttings directly in pots so we would not have to move them following rooting and there again we didn't determine any differences. So neither the starting of the plants in the pots nor the transplanting shock following potting had anything much to do with the loss of the plants either soon after potting or during the winter.

There are a number of things which could cause these plants to die during rooting. In the first place, they could die of starvation if you want to put it that way. They might exhaust their food reserves in the production of roots and the foliage that had developed on them might be incapable of furnishing sufficient sugars to maintain the life of that plant and give it sufficient impetus so it would go on and grow. Now that, frankly, seems unlikely to me; nevertheless, it is possible.

They might die from transplanting shock and that would apply in particular if one were to take his rooted cuttings and pot them too deeply. Deep potting is something to watch out for with cuttings of many types and I think that applies particularly to viburnums. Nevertheless, I don't think that the most of us plant our cuttings too deeply and I would, therefore, not attach too much importance to this factor.

The third thing that might cause difficulty with those cuttings would be the prolongation of dormancy. In other words, when we take the cutting in the rapid growing state away from the plant and put it in the rooting medium and it roots, we do not ordinarily get a continuous growth. It is likely to go into dormancy let's say in July and if dormancy has to be prolonged from July until the following April that is quite a different matter from the normal dormancy which might be experienced from October to April.

There may also be difficulties involved in dormancy at high temperature which usually will be experienced in July and August and the early part of September. I think there might be some difficulty connected with prolonged dormancy which would account in part at least for the failure of these and certain other cuttings to survive the winter and become good plants.

There is a further factor which I think is of considerable importance and that is this: I think that the age of the wood or the age and development of the tissues at the surface of the soil has a very great deal to do with survival. Although I am not a professional plant pathologist, I believe that what we are dealing with may be primarily a disease problem and that the diseases affecting these cuttings are closely related, and possibly even precisely the same, as damping-off of seedlings.

I have further observed if we wait very late with our one-year shoot until it is very hard, then the survival over winter is a little better than it will otherwise be, but if we have this twiggy two or three-year old wood at the base of the cuttings we seem to get reasonably good rooting and reasonably good survival. That system worked out comparatively well on that occasion with *Viburnum Juddii*. It isn't my custom to leave out those occasions on which my little schemes fail, because it very often happens they don't work. The following year with *Viburnum Carlesi* we attempted the same thing with 280 cuttings and none of them were alive on the 20th of March the following year. *Viburnum Carlesi* is another species where we made the cuttings later. Also, they might have experienced quite different conditions during the period of storage because we had them in a pit house in which the temperature fluctuates. Nevertheless, the indication we got with our experiment of 200 cuttings of *Viburnum Juddii* is to my mind of sufficient significance to warrant someone going on with this problem and trying to solve it on the basis of type of cutting wood and on the basis possibly of using a sterile medium and also on the basis of varying the winter storage temperatures and other factors which might contribute to losses in these plants.

Now with regard to the rooting itself, the soft shoots will root in about three weeks and the twiggy shoots in about six weeks. The difference in percentage of rooting between those two types of cuttings is practically negligible. It is simply that the older shoots take longer and survive better, and I might say in addition that once these cuttings are rooted and are through the first winter they make fine plants. They do well on

their own roots and I should think if any commercial grower could find the means of rooting these plants 50 per cent that it would probably be a profitable undertaking.

Are there any comments or questions?

MR. FRANK O. ANDERSON (Erie, Pa.): Did you use hormone powder on those?

CHAIRMAN FILLMORE: Yes, I did use hormone powder. I used Hormodin 2. I would say in general that hormone powders probably haven't got much value on viburnums. That is a debatable topic and I should think someone would have comments on it.

MR. JOHN VERMEULEN (Neshanic, N. J.): My question is, Where were these viburnums kept in the winter, in a warm greenhouse or a place where they were frozen and kept dormant?

CHAIRMAN FILLMORE: They were placed in a cold pit house where the temperature runs from 35 to 40 degrees during most of the winter. Following March 15, the temperature went up, they began to grow, and in late May we bedded them out.

MR. VERMEULEN: May I ask one more? We have experimented a lot with these particular types. We have grown *Viburnum Carlesi* for a number of years, I would say almost 10 years, and we have found some of the problems you have found, that the plant takes well when the cutting is late, especially *Viburnum Carlesi*. We have experimented by taking our cuttings out of the greenhouses and putting in a cold frame in October, and after having them in the cold frame when winter comes we just let them freeze and we find we get at least 90 to 95 per cent good plants in the spring. It may be the answer. I can't guarantee it.

CHAIRMAN FILLMORE: Well, that sounds like a very valuable comment. Mr. Vermeulen has found if he stores the cuttings in a frame where they will actually freeze up they will winter better than in a warm greenhouse or even a greenhouse of 35 or 40 degrees. That sounds perfectly possible to me. For one thing, the disease organisms which I personally feel are most responsible for these losses simply will not thrive when the ground is frozen and they may thrive to some extent at 40 degrees.

MR. JACK BLAUW (Bridgeton, N. J.): I would like to know what medium you used in the cuttings.

CHAIRMAN FILLMORE: The medium I used on that particular lot of cuttings was Flowerite, which is also sold under the name of Perlite. It is a light, white, fluffy sort of stuff. I don't think the Flowerite would make any important difference in the results. I think substantially the same result would have been obtained in sand or sand and peat or vermiculite or several other materials which could have been used.

MR. CARL KERN (Wyoming Nurseries, Cincinnati, O.): You spoke of losing some of your rooted cuttings after you had taken them out of the sand. I believe the loss occurs largely because you lift your cuttings out of the sand when they have only formed so-called primary roots. If you permit your viburnum cuttings to remain until they have formed a secondary root system your losses are cut to zero.

I have had experience with *Viburnum Carlesi* with the humidity

system and they form a root system like a bottle brush. I thought they were okay, let's pot them up, since they were 95 per cent rooted inside of 10 days. Out they went and they turned to black stumps, while on the other hand, we rooted Juddii, Carlesi—I just made these for a test—late August or first week in September and permitted them to remain in the sand until just about two weeks ago. We took them up and they had a secondary root formation and every plant lives. Never move your cuttings out of the sand until you have a secondary root system formed.

CHAIRMAN FILLMORE: That sounds like a valuable comment, too. I notice you took them on the late side so you had very firm wood.

MR. LESLIE HANCOCK (Cooksville, Ontario): Further to what Mr. Kern said, and you mentioned starvation, have you given thought to the possibility of liquid feeding, before removing?

CHAIRMAN FILLMORE: I haven't particularly, but I think liquid feeding before taking them out would be important. Years ago we were all taught that the medium had to be sterile, the sand had to be clean and so forth, and a great deal of that is apparently just pure nonsense, because I see lots of folks who are getting excellent results in a medium which is neither sterile nor clean and they use plenty of nutrient solutions to build up the cuttings prior to taking them out of the cutting bed. I should think following rooting a shot of nutrient solution might work out nicely on a good many types of cuttings, including viburnum.

MR. CASE HOOGENDOORN (Newport, R. I.): Since we had so many losses, what we tried a couple of years ago was to make our cutting rather hard after the middle of August and stick them in flats of sand and gradually harden them off and carry them in the cold frame without disturbing. In the spring we take them out and plant them, and have good results by not disturbing them at all.

CHAIRMAN FILLMORE: That is what we tried to do with our potting and it worked out well enough. I think now, from what you gentlemen have said, if we had dropped our storage temperature from 35 or 40 down to 25 or 30, that we would have had a great deal better success, and if I had an opportunity to experiment with this again that is one of the things I would do, just drop the temperature and see if that wouldn't help solve the problem.

DR. J. R. KAMP (University of Illinois): I want to make a comment about Mr. Hancock's suggestion about nutrients in the rooting medium. We have found on a number of things that we get better results if we apply nutrients to the rooting medium about 10 days before we are going to take the cuttings out. This would be especially good in the case of your leaving them in to get some secondary roots. If you apply the nutrients about 10 days before you take them out, they are ready to send out some extensions of their roots in about 10 days. That means just at the time you are getting them into the pot they are sending out new roots, so you don't have a stoppage in root growth and it really works quite well.

I had a question about this Perlite. Just what grade? What size particles are those?

CHAIRMAN FILLMORE: It is a comparatively fine particle size. It would be about like No. 7 silica sand or a little finer.

Any other comments or questions?

DR. HENRY T. SKINNER, (National Arboretum, Washington, D. C.): Your remarks about *Viburnum Carlesi* reminds me of a little experiment we did at Cornell a few years ago with *Viburnum Carlesi* when the growth substances were just coming out. We rooted quite a batch of *Carlesi* and carried them through the winter, as I remember, all the ones that were rooted with growth substances came through the winter and all those rooted without treatment we lost just about 100 per cent. It was a little interesting then on the basis of the growth substances. Since then it has occurred to me it is probably connected with the point Mr. Kern brought out, the ones with growth substances rooted a little early. Those were probably early July cuttings and they became established and made a rather better root development, and as a result, those plants carried through the winter, whereas, the others didn't.

Of course, in the matter of azaleas, with which I am a little more familiar than viburnums, I always say that azaleas of difficult types should be rooted early. If there is a little top growth in the winter in the greenhouse, you will have no losses. I think the same principle applies with viburnum except you may get by with extra root development instead of top growth. I think that growth is very important, and once you get that, I don't think you have trouble over-wintering.

CHAIRMAN FILLMORE: I would just like to comment on that very briefly. I can see there might be very great value indeed in having a heavier root system. As far as the development of tops on these viburnum cuttings is concerned, on the basis of this little test of mine, it doesn't make any difference. The plants which did not develop new growth came through just as well as the plants which did. Now it is entirely possible that the more heavily rooted ones survived better than the more lightly rooted ones. I didn't attempt to separate on the basis of light rooting and heavier rooting. Some of them were cuttings potted before rooting and we didn't have an opportunity to examine them. Any other comments or questions?

MR. DeGROOT (Sheridan Nurseries, Ontario): A few years back, it must have been in the twenties, we tried *Viburnum Carlesi* from cuttings. They were all lost, which was discouraging, but afterward we left them two years outside in the frames where they were first planted and there was a bigger percentage for transplanting.

MR. JACK BLAUW: I did the same and we planted them for one year in the frame and they grew very well. We made the cuttings in the greenhouse and planted them in the cold frame and left them there for a full year and the next spring dug them out.

CHAIRMAN FILLMORE: These cuttings were made up in the greenhouse, planted in the frame and left there for one full year, following which they could be field-planted without losses. Any other comment?

PRESIDENT WELLS: Dick, I would like to make a comment, if I may. I think that Carl Kern has got something really important in this secondary root system. It is wrong perhaps to consider what viburnum will do in the light of how other plants behave because every plant is an individual, but we have found in other forms of plant propagation that if we can obtain a secondary root system, that is small branch roots from the soft primary roots which emerge from the cutting in the first instance that

those cuttings with the secondary root system will stand much rougher treatment, will go ahead more vigorously and generally are far less difficult to handle and deal with.

Our preoccupation with this problem was directed to machine planting of young material and cuttings coming out with soft roots couldn't be machine-planted. They just wouldn't take it, but get the roots toughened up and get a secondary root system and they will take it very well. I believe that is a very fundamental point.

CHAIRMAN FILLMORE: Are there any other comments on this topic of rooting viburnums with cuttings? If not, we have two other speakers, Mr. Kern and Mr. Hoogendoorn.

PRESIDENT WELLS: This question of viburnums from cuttings is not closed because we pass along to the next subject. If anyone gets a brainstorm and thinks of something, by all means get up and say it. These proceedings are going to be edited and put into some sort of order before they are finally printed. What we want is information, so at any time during the meeting if you have something to say on any topic, please come forward with it.

Now our next speaker is Carl Kern, and probably many of you know him much better than I do, but on a number of occasions I have met him and his wife, whom I am very glad to see here, too. She always comes with him to these meetings. Carl is another one of these real plantsmen. He sent me a magnolia some long time ago. I planted it in my garden and a man came along with a mower and cut the thing to the ground, and that was the end of Magnolia Carl Kern.

MR. CARL KERN: You will get another one.

PRESIDENT WELLS: That is what I had in mind. (Laughter). Without more ado, therefore, I would like to present Carl Kern, Wyoming Nurseries, Cincinnati. (Applause).

MR. CARL KERN: Mr. President, ladies and gentlemen: It gives me great pleasure to appear before you this afternoon and speak to you on the subject of viburnum. You know viburnums and magnolias are two of my pet hobbies. I have played around with those plants all my life. I give magnolias primary choice and viburnum second.

Just a few short remarks to give you some idea of the importance of the viburnums. We know of about 120 species of viburnums which are native of North and Central America, Europe and North Africa and of later years we have received these wonderful comparatively new introductions from eastern Asia which can be enumerated as high as from 54 to 70 Asian species. So you see, we have a tremendous reservoir of plant material to deal with from these viburnums.

All the viburnums are highly valuable shrubs of great plant material value in landscape composition or wherever else they might be used. We have tall species viburnums that will attain a height of 25 to 30 feet, such as *Viburnum rufidulum*, and I think I have another one here *Lentago*, the common inkberry, a native species.

Then, on the opposite side we have *Opulusnanum*—a plant about 18 to 24 inches in height, and the next medium-sized shrub, *cassinoides*, a very valuable plant in any landscape composition.