The Grafting of Some Maples

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The experience upon which I base the following conclusions regarding the grafting of Maple varieties has accrued over a thirty year period. I apologize rather than boast of that because in that time much more definite data should have accrued than I have available to present to you.

My Maple grafting experience has been largely with Japanese Maple varieties, select types of Acer Rubrum, Special forms of Sugar Maple and attempts to graft Acer Nigra on Sugar understocks. (The less said about the latter the better). Although if successful they would have little commercial value.

Japanese Maples are often injured in our section by early Fall freezes like the one in October that killed back our Weigelas. Hence securing good and un-injured scion wood is sometimes a problem in winter grafting. However as a rule Maples graft quite readily and offer no insurmountable problems.

To follow them in an orderly manner we should perhaps discuss the understocks first. It has always been our preference to have our understock of slow rooting or coarse rooted deciduous items established one year prior to grafting, as we feel there is less loss of valuable scions and labor. In summer grafts, this of course, is a necessity. Speaking of summer grafts that was at first the only time we grafted Maples. July or early August and outside in frames under glass with canvass shade in the same type frames we use for soft wood cuttings plunging the pots and union in sand at the usual angle. Our results were satisfactory if we syringed the grafts for a few days to prevent excessive wilting of the scion foliage. Good shade is essential. If, after a few days the leaves have not dropped off the scions the critical period is over. However, some of the scions may be ripe enough to hold up, knit and start new leaves the same season, even though the original foliage on the scion does not hold on. Plants left in the frames over winter can be planted out the following spring. Just a comment however, that they are better bedded out where they can be given a little protection than given full exposure. Such resulting grafts are almost a year ahead of winter made grafts.

A modification of the above is bench grafting in the greenhouse in the summer. The biggest problem with us is to keep down the frame temperature by ventilating the houses and shading them heavily enough to prevent wilting of the scion during the previously mentioned early critical period.

After talking with Jim Wells in Detroit last summer I made up a hundred each Jap Maple and Viburnum Carlesi grafts as a controlled experiment on which to report at this meeting, with some exhibits. Grafts were made in late July. We had the house shaded with camouflage cloth. In re-glazing an adjoining house the contractors took off all the shading cloth over the house containing the grafts which were also in a glass covered sweat box. With daily temperatures in the high nineties they cooked quickly. At that a few survived and yesterday I took out several good plants which were heavily calloused, and which had sprouted from eyes

at the peat level or below. Before that accident they were coming along nicely. Also a much higher percentage of Viburnum Carlesi survived than did the more tender Japanese Maples.

In regular winter grafting, if the understocks are established it is better to graft before foliage starts, although I always like to see a little root action starting. Otherwise, the scion may pop out in leaf and wilt for lack of any sustenance from the root. This is much more likely to happen if the understocks are fall potted before winter grafting.

Fall Potted Understocks

We always like to put our Maples in a cool house both to root up, and when grafted. About this cool house, we use one in which night temperature may run as low as 40° house temperature.

As to technique, there is nothing unusual—we use a Veneer graft and plunge, but not pack, just cover the graft with Peat Moss in a grafting case. Laying the whole plant at an angle.

For some years we have been dipping our scions in another waterproofing compound to try to avoid the deteriorating effects of wet media. This year I am going back to paraffin or try Howard Taylor's plastic to coat the scions.

Much of our loss in Jap Maples particularly, can be attributed to the factor of too much moisture, often times this area of the scion covered by the grafting media will soften up and die. The reason we gave up dipping scions in paraffin or wax mixtures was that it slowed up grafting. The same goes for waxing with a brush but we may have to come back to it.

Nearly equal results to plunging in a gratting case can be obtained by doing the same thing on an open bench with peat or sand and peat mixture. Results are slower but there is less likelihood of damping off of leaves. I can't get by with just waxing the whole scion and union and setting them on the bench to "hatch" as some good propagators say they do, although if we had our Binks system of humidification working it might do the trick.

In standing the grafts upright in a deep case in peat the percentage results were off due to air space around the union which allowed too much drying. This result was not peculiar to the Maples, but was universal, I might say in all the grafts handled in that manner, Junipers, etc.

The disadvantage of Case grafting of the Acer palmatum varieties is the difficulty of preventing mold on the new soft leaves before they are ready to have the covering sash completely removed. We ventilate the frames and keep the understocks well cut back. The only thing other than ventilation which we have tried to control this fungus on leaves, was a rather sparing trial of "Sterile Lamps." I am not prepared to say that they helped too much in the control. I believe we were too afraid of injury to the soft growth. These same trials and tribulations occur to a limited extent with other Maples. However these leaves seem to be sturdier and less susceptible to mold.

We use only Palmatum Understock for Jap Maple varieties. For Sugar Maple type, of course only sugar Maple stocks. We have used Silver Maples for Acer rubrum, when rubrum understocks were not avail-

able. Sugar Maple stocks were used for grafting Black Maple (Acer Nigrum), but in two attempts I have never had any success.

Let me summarize the points which I believe lead to success in grafting Maples.

1. Select un-injured scions.
2. Wax the scion.
3. Plunge in a damp, but not too wet media, just covering the union, but not packing tightly around it.
4. Ventilate the grafting cases frequently, especially as the buds start breaking.
5. Cut back the understocks to prevent crowding.
6. Get the grafts standing up on the open bench at the earliest moment, even syringing frequently to keep from wilting. After a few days they harden up and require only routine attention.

We normally throw some newspapers over our grafts just as a little additional protection from shade when they first stand up. That little foliage is very tender.

Summer grafting gives a completed and dormant plant to handle the following spring as against one in leaf resulting from the winter grafting operation. One can also be sure in summer that the scion is alive and uninjured. You do have to be a little more careful of it. You can't knock it around like you can the dormant scion in the winter and you can't store them. I believe the percentage of good grafts should be about the same from either of these methods. Thank you. (Applause).

MR. HOOGENDOORN: Mr. Burton, do you wax your scions when you put them in the grafting case?

MR. BURTON: Yes, we do it beforehand. I dip the scions in wax before we even make the cut. We haven't painted the union afterward.

MR. HOOGENDOORN: Why do you graft in a frame in the summer, because it is too hot in the greenhouse for your maples?

MR. BURTON: We do it both ways, Case. As I said, we started and grafted outside in frames, and I would just as leave do that, but since the greenhouse's are open in the summer we are not doing any other grafting in there. We just use them and put our maples in.

MR. HOOGENDOORN: Do you have much trouble?

MR. BURTON: Not as much in the summer as in the winter.

MR. HOOGENDOORN: Is it easier to control your temperature in the frame than in a greenhouse. The temperature is much higher in a greenhouse than a frame.

MR. BURTON: To answer your first question, the only reason I can give you why we use our frame is that ventilating it to keep the temperature down you get an awful circulation of air over your newly-set scions, whereas in the sweat box they are protected from that wind or air circulating over them and causing quick wilting. We think if we protect just a few days until they get hardened up, they are safe. They usually are.

MR. HOOGENDOORN: Do you also bury your union in the sand in the summer?

MR. BURTON: Yes, the union is covered by the grafting media whether it is peat, sand or a mixture of both.

PRESIDENT WELLS: We wax all ours and, incidentally, in that waxing we don't paint the wax on. We made a little tin gadget which is a circular piece of tin with a V-shaped cut in it and a handle down, which slips over the top of the plant so the plant comes through the V and we can insert the whole thing over a bucket of wax and dunk it. The plant doesn't fall into the wax and we can do it quite quickly, as fast as you can put one in and out.

What I wanted to ask you was this: When we have united our grafts and they have made their first growth, they make a vigorous first growth in the greenhouse and no matter what we do they stop. They don't make any further growth until the end of the summer. Do you think there would be any value in passing the shrubs once they have grown and come to this dormant condition through a cold temperature of 35 or 40 degrees for a couple of weeks? Do you think that might break that dormancy and when they go out they might start growing again?

MR. BURTON: That is not a simple question to answer. It is my thought, Jim, that these Maples, when they come out of the grafting case are so tender that any cold sufficent to break the dormancy would also be fatal to them. It is an interesting thing to think about, and might merit some experimental work.

MR. FLEMER: We tried that with just a few and it killed them.

MR. FILLMORE: I was just going to comment on Mr. Burton's remark that waxed thread was as good or better than rubber hands.

MR. BURTON: These rubber bands do cause a lot of injury by cutting in, because when you put rubber bands on plants that are dormant you get an immediate expansion of growth as soon as that plant starts to grow and they start choking. I think there is a lot more damage done to grafts in that manner than we have ever thought.

PRESIDENT WELLS: Jack Blauw suggested that we use a rather coarse grade of cotton twine, the type they use in the drug stores to wrap up packages. It has a very low tensile strength. We do not wax that thread beyond dipping it into the molten parafin wax, so the ball doesn't unravel in use. It usually holds together long enough for the graft to go through the bench out into the open ground and we don't have to cut it, loosen it or do anything to it. As the wax breaks and the stem expands, moisture gets in and this cotton thread rots and we get no girdling whatsoever.

MR. LOUIS VANDERBROOK: (Manchester, Conn.): I would like to ask the number of that thread he uses.

PRESIDENT WELLS: No. 3 cotton twine.

CHAIRMAN NORDINE: The question has been alive in the nursery for sometime. What about fall coloring which is the principal asset and prime value in any form of *Acer rubrum*. I have been grafting forms of *Acer rubrum* for seven or eight years on soft maple and I find that the soft maple has absolutely no influence whatsoever on the ability

of *Acer rubrum* to color in the fall of the year. In fact, one form of columnar *Acer rubrum* ripened and showed excellent fall color earlier this year than it formerly did on its own root stock, the fall color is not lost on a different understock

MR. JOHN SIEBENTHALER (Dayton, O.): I wanted to ask you if you have had any experience in observing older trees of *Acer rubrum* that had been budded or grafted on soft maple?

CHAIRMAN NORDINE: No, I am sorry.

MR. SIEBENTHALER: I am sorry, too. We had several hundred beautiful trees budded on soft maple. When they reached four and five inch diameter, they broke off at the union. There was a beautiful design there where the union was, a crystallized effect and that was the end of a good-sized investment, so it is something to consider.

MR. VANDERBROOK: Getting back to the waxing problems. If you use a high-melting wax, your wax peels off. You have to use a low-melting wax, about 128°.

MR. CHARLIE HESS: Has anyone experience in growing Japanese maples from cuttings?

CHAIRMAN NORDINE: Of all the books on nursery propagation, there is only one book that mentions growing maples from cuttings. That is an English book by a Mr. Sheat. It is "Propagation of Trees, Shrubs and Conifers," he says. *"Acer cappadocium* of half ripened wood from forced plants under glass and the cuttings in a closed case rooted very well in three weeks." Otherwise, all of these references are brief, but it is just to give you some thought to think about and go home with.

There is a little bit of information in some works in regard to the experimenting of maple cutting in the early days of root hormone, those reports are of such little value that I passed them over, but it is the beginning of work on growing maples from cuttings.

The most interesting of all is by C. C. Thomas who did his work at Beltsville under the Federal Department, and he records his work in the National Horticultural Magazine for 1936, Volume 15, page 103 to 107. He used in this particular case this method: He placed his cuttings in glass cases that were 24 inches high with sliding doors. The benches were heated with lead cable to 72 degrees. The sand temperature varies two to three degrees. Air temperature was about five degrees less, meaning 67 degrees. Sharp, washed sand was used that had a pH of 6.2. He made hardwood cuttings and stuck them into this glass case and he used *Acer binerve, caudatum, cissifolium, rufinerve,* and *Tschonoskii.* These cuttings were made on February 27, and the time period extended up to the first week in April. The rooting, for instance, on *A. caudatum* that was taken in late February, rooted in 28 days with a percentage of 89 per cent rooting. Other cuttings required longer periods, up to 40 days. From some of them he got 89 per cent rooted, others only 20 per cent.

Then as the new growth developed to four or five leaves about one inch long, they were pulled from these cuttings. These short green wood cuttings were pulled off with the heel and put back in the case with the hardwood cuttings and then similar material was pulled from plants outside and in that case all the leaves were left on.

Now in this particular work, he used 17 different species of maple as follows:

Acer barbinerve
carpinifolium
cissifolium
Ginnala
palmatum
pictum mono
Pseudo-Sieboldianum
rufinerve
Tschonoskii
negundo
rubrum
argutum
caudatum ukurunduense
mandshuricum
micranthum
triflorum

The cuttings were taken from February to July, cuttings were rooted from 18 days to 55 days. He had all the way from 100 per cent with *A. caudatum* to the *A. Palmatum* taken on May 11, rooted in 21 days with 65 per cent results.

The poorest results were cuttings taken on the first day of June, rooting in 37 days and the variety was *A. Miyabei.* They rooted 50 per cent. There are many others. *A. Argutum* is another one with 50 per cent results. Many of them rooted 75, 80, 85 and 90 per cent up to 100 per cent in this particular work.

And answering this question on Japanese maples, he used nine different varieties. The plants were potted and in the greenhouse, and by the way, these were plants that had been imported that spring from Europe. The cuttings were made as early as March 13. In that case, it took 140 days to root. Other cuttings were taken throughout the month of April. They took from 37 days to almost 60 days to root and in all cases these cuttings rooted very well. Cuttings were taken as late as on June 3 and June 15. Cuttings taken on June 3 rooted in 65 days, cuttings taken on June 19 rooted in but 35 days. All of this was in that particular closed case.

CHAIRMAN NORDINE: Now, the most interesting of all was some work done by Steve O'Rourke. His paper, his work, his records, and so forth, are not available, so it came to me second-hand from a man who quoted from memory. This is by the new method of mist propagation.

They used cuttings of wood which had grown to a full season length but which had not yet passed from the soft stage into the hard stage. These were used under mist, in a greenhouse under ordinary cultural conditions, sand being the medium. Norway maple rooted well and were planted out in late summer and they wintered well. *A. Buergerianum* rooted well but it did not winter. *Acer campestre* rooted very well but it did not winter. *Acer nikoense* failed entirely. Many more maples were used but Mr. Morris quoted these to me; he did not remember what the others were.

MR. CHARLES HESS: I happened to be out at the Greenbrier farms a year ago last summer and they had about 10,000 Jap maples in the greenhouse. They had a beautiful stand. They just tried it and it worked.

Now we did some work last winter with forest types of maples and they rooted in open bed, no bench, just open house bed, shaded, that was all. We now have those outside. We don't know whether they will winter. They made beautiful growth this summer and they are now outside.

MR. FLEMER: We have fussed with Jap maples from cuttings for years. At times we have stuck as many as 10,000 when we thought it could be done and we have never had any trouble getting a good stand rooting, but we have never succeeded getting them through the winter. They were planted outside in cold frames, potted up, rooted in boxes of peat, and left. The roots start to go bad around the callus and the tip of the root will still be alive, but the thing is dead.

MR. KERN: In regard to rooting Jap maples from cuttings, I have mostly concerned myself with the production of the green type of *Acer palmatum*.

I have been bringing full plants into the greenhouse, usually beginning in January, and forced them into growth, took off the soft wood cuttings, usually about the 15th of February, and from 18 to 21 days we have them rooted. We put them in an open sand bench with lead cable underneath carrying a temperature of about 70°. As soon as they are rooted we pot them in a two and a quarter inch pot and in that same current season we are able to produce a maple understock the size of a pencil, which we can use for grafting material.

Last year, I brought in a plant of *Acer Japonicum aureum*. We forced the plant in growth and took the cuttings off like we did with the palmatum, green form. I could not get any results from the Japonicum cuttings. That perhaps was due to the lack of chlorophyl content in the foliage of that plant. The rooting of the green form is highly successful and I recommend it. To grow a good Acer palmatum from seed usually takes about two years' time. In this case, we were able to do it in one year.

MR. KERN: I also mentioned I dipped these cuttings in Hormone No. 10.

PRESIDENT WELLS: This batch of cuttings of Greenbrier seems to have bitten a lot of people, because I have heard about this half a dozen times. However, I did call in at Westbury Rose Company on Long Island, Mr. Vosburg is the manager.

Mr. Vosburg is a good propagator. He had a bench of Japanese maples there which I saw, which were beautifully rooted. He told me he had done it for a number of years. He had wintered them quite satisfactorily in frames. The cuttings were put in early. It was early June. We did pull up a couple of cuttings and he does grow them without any callus or practically no callus, and I don't know how he does it, and he does it on magnolias, too.

QUESTION: What was the rooting medium?

PRESIDENT WELLS: Plain sand. He has a mist system there somewhat different to the orthodox one. He has a sheet of burlap at the

side of the greenhouse with jets that spray on the burlap and soak it and he saturates that every hour or so during the summer.

MR. PIETER ZORG: I have had a little bit of experience of rooting Japanese maples from cuttings. About three years ago I started out with a very small amount, put them in a mixture of fine peat moss and one sand. They seemed to root pretty good. I put them during the winter in a frame and in the spring I had nothing left. They were all gone. Last year, I tried it again and this time I put them into three peat moss and one sand, used Hormone No. 3, and I put them right away in pots. During the winter I kept them this time in a cold greenhouse. When the temperature goes very low, I open up a door between the heat house and the cold house, so they don't freeze too hard in there. I had that time about 50 per cent of those cuttings survive the winter.

MR. J. RAVESTEIN (Mentor, Ohio): I made 800 cuttings of Japanese maples. I started out with a mixture of three peat moss and one sand. Excuse me for the language yet, but is 2¾" pots right? (A voice: Yes). Put sand in and put five holes in there with a pencil, put my cuttings in, this No. 3 hormone powder, and put them in the sweat box, and let it be real warm. They can have a lot of temperature but be careful with the sun. We had white cement under the greenhouse and burlaps hanging in the greenhouse and still they burn up. I had to put newspaper or cloth over the glass. They couldn't have any sunshine and they root in about 10 days, most of them.

I think rooting Japanese maples is easy if you take the right time and the right strength cuttings. You can't go down to the field with a shears and go ahead and cut them off. It takes you about a morning to take 1500 or 2000 cuttings. Keep them moist and bring them in and cut them off.

Most of the time you are supposed to cut them off about a quarter inch below the node, but I found out when you cut them off on top of the node, about an inch they grow faster than the other ones.

I make them around the 10th of June and had them in the sweat box for about five months and took them out and potted them. The ones that were not rooted, I stuck them in again in the sand medium, but no powder on them any more. As I can see so far, they are living. I had them in the greenhouse with a temperature of 50°. I am going to turn the heat off and give them a little rest.

Mr. Zorg was over to my place a week ago. (Dec. 1st). He can tell you the rooting is starting again. I don't think I will lose one of them. We have little cuttings in the frame from last year. They are that high, with four or five side branches.

It is not difficult to make Japanese maples under the right conditions. It took us three weeks to make these cuttings and the last week it was too late. You have to do it, I believe, in five or six days. It depends on what temperature you have.

MR. HANCOCK (Cooksville, Ontario): I have had no actual experience in rooting Japanese maples but I think that something is being missed by some of the propagators. There is no trouble to root them, but they don't grow. Now you rooted them in peat and you have the roots and you say you can't winter them. Anything that will root theoretically

will grow. If you watch the old plants all through the country, where do you get the most vigorous Japanese maples? Always where you have an alkaline pH or less or a neutral or alkaline. It doesn't make any difference how kind we are, they are not vigorous like the Japanese maples on clay loam.

In my opinion, what you have missed is probably a question of pH in your growing media. That is just an opinion from the floor on why you have lost out in wintering.

MR. RAVESTEIN (Mentor): What do you want me to use, more peat or sand?

MR. HANCOCK: I think the peat moss is an excellent media. I think any plant that is naturally neutral or alkaline association can't be left indefinitely in that said media. You have got a neutral or alkaline change to that as soon as you get it rooted. Do you know what the reaction of your potting media is, whether it is acid or alkaline?

MR. RAVESTEIN: Well, I tell you one thing, the last cuttings we didn't pot. I don't like to pot a plant without any leaves. They started growing again. I think next year I am going to put a little more peat moss in my pots.

MR. HANCOCK: Pardon me, if I speak again. I think they are mixing up aeration with pH. You get plenty of aeration in the peat. It may not be the peat that makes it root but the aeration. Sooner or later you have got to get that acid to slightly alkaline or neutral.

MR. RAVESTEIN: It takes you a while to pick cuttings, the cuttings from the top of a maple don't root, they are too soft, there is too much strength in there.

MR. HOOGENDOORN: Do you take the side branches?

MR. RAVESTEIN: I take side branches and I like to take cuttings from plants transplanted in the spring.

MR. HOOGENDOORN: You will have a better cutting.

MR. RAVESTEIN: I believe that the cutting is harder. If it is two years in the field it is too much strengthened.

MR. RAVESTEIN: You know when a maple will grow twice, wasn't it on the 8th of October, the last one?

MR. ZORG: About that time.

MR. RAVESTEIN: I make 60 cuttings

MR. HOOGENDOORN: That was on second growth?

MR. RAVESTEIN: I don't think there is much use making cuttings from the second growth. I think you should pick them in five or six days and even when you see the tip you know when a maple grows it has two little buds on the top and it stops growing and you see a little red point. Don't take those cuttings.

MR. HOOGENDOORN: They have started again.

MR. RAVESTEIN: They don't grow.

MR. FRANK O. ANDERSON (Erie): When does the sap stop in the maples you mentioned and when does the sap begin again?

MR. ANDERSON: What I mean, I think the maple tree is perhaps the only tree where the sap stops in June.

MR. RAVESTEIN: That is right.

MR. ANDERSON: It begins to slow down in June and the sap begins to come again perhaps the last week in October.

MR. RAVESTEIN: Oh no, sir.

MR. ANDERSON: On sugar maples it will come in October in certain places in the country.

MR. RAVESTEIN: Not on Japanese maples.

MR. ANDERSON: It may have something to do with it.

MR. RAVESTEIN: I think the sap in a Japanese maple never stops, only a little time. When I took cuttings from mine, underneath the ones which were not full grown the top was still growing again.

SATURDAY AFTERNOON SESSION

December 13, 1952

The final session convened at 1:45 o'clock, President Wells presiding.

PRESIDENT WELLS: Gentlemen, please come to order. We are 15 minutes behind time. We have to keep up to this British reputation.

I don't know what one Englishman should say about another or perhaps Henry is an American by now. I don't know his present status except that it has recently become a married one, and that Henry is another real good plantsman. Most of you know of his original work on the propagation of rhododendron from leaf-bud cuttings. I think he was the first person to publish any information on that method. Just why he has chosen "The Vegetative Propagation of Oaks and Suggested Research Technique" I don't know. I have never heard him talk about oaks before, so I am going to be very interested in what he has to say.

He has recently changed his position and some indication of the caliber of the man that he is is the fact he is the new Director of the National Arboretum in Washington. Henry Skinner. (Applause).

DR. HENRY SKINNER: Mr. Chairman, ladies and gentlemen: After that introduction I must certainly try to do a good job—even on oaks.