

MR. MERTON L. CONGDON (Congdon's Wholesale Nursery, North Collins, N. Y.): Fellow members and guests: I consider layering, next to the actual division of plants, about as simple a method of propagation as there is. In order to cover it most thoroughly and perhaps to avoid some questions later on, I prefer to read my talk. I have a limited number of slides which I will show at the conclusion of my talk showing the actual layering process and the results we get at the end of two years in the field with these layers.

MASS PRODUCTION OF DECIDUOUS SHRUBS BY LAYERS

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When I was asked to present this talk on the mass production of layers, my first thought was that there are many nurserymen that are much better qualified to present this subject than I. However, at our nursery we have perhaps developed some methods that have speeded up the actual layering process to a point that they may be worth presenting here.

In this discussion we are going to touch upon the following topics:

- History
- Types of Stock
- Row Spacing of Beds
- Soil Type
- Time of Layering
- Procedure
- Follow-up
- Gathering
- Costs

HISTORY: Some history of my experience is necessary to present this subject properly. Prior to 1940 when my brother and I were operating the H. E. Congdon Nursery we were concerned only with the propagation of small fruits. It was at that time that we were approached by Mr. Ralph Lake and Mr. Bert Lake of the Shenandoah Nurseries, Shenandoah, Iowa about the possibilities of growing deciduous shrubs for them in our favorable climate and soil. At that time they were concerned most about a good source of *Hydrangea A. G.* and *P. G.*

At first we bought all of our lining-out material or Lake's had it sent to us. We noticed that in every case, layers produced better stands and growth than liners produced from soft wood cuttings. Liners grown from field grown hardwoods did better yet but we soon found that this method was unpredictable and expensive. We had considerable experience with tip layering of raspberry and felt that layering of deciduous shrubs was the field where we should start.

Armed with that information we set out to find the best method of establishing and maintaining a layer bed. It is at this point that I should give

due credit to the following firms that were very helpful in showing us their methods:

Champion Nurseries, Perry, Ohio
Thomas B. Meehan & Co., Dresher, Pa.
Cedar Rapids Nursery Co., Cedar Rapids, Iowa
Foster Nursery Co., Fredonia, N. Y.
R. A. Hacker, Painesville, Ohio

I believe that all of these concerns except the last named are still in the process of producing layers and have many more years of experience than I.

In 1950 when the partnership forming the H. E. Congdon Nursery was dissolved, most of the layering beds were located on the property which I am now operating.

TYPES OF STOCKS: As time went on it became quite apparent to me that many more shrubs could be propagated by layering than the *Hydrangea* A.G. and P.G. with which we started. We have been most successful with the *Deutzias* - *Gracilis*, *Lemoine* and *Rosea*. Also with some of the *Philadelphus* but most particularly *not* *Virginalis*. Most spectacular of all is probably the *Opuloides* type of *Hydrangea*. We specialize in the varieties *Nikko Blue* and *Domotoi* but there is a whole list of these varieties that layer very successfully. I am now starting to work with some of the *Viburnums* but am not prepared to state as yet which varieties are practical to layer and which are not.

There are several other shrubs which we layer by the same methods but do not root. These produce an etiolated cutting that can be rooted the following year in field rows and produce a much better stand than cuttings that are not etiolated. We have had the most success with this method in *Weigela Variegated Nana* and *Philadelphus coronarius aureus*.

I should point out that the items I have mentioned produce layers in one season on the current year's growth. It is a well known fact that a great many deciduous shrubs can be layered if left for two full growing seasons but this wide range of material we must overlook if we are to use the procedure outlined here. In this discussion we are not interested in all items that it is possible to layer but rather those that adapt themselves to our labor saving methods.

ROW SPACING OF BEDS: If there is any disadvantage to our method of layering, it is the fact that it takes considerably more land on some subjects than the conventional methods. Our first error was in spacing the rows too narrow and it was later necessary to remove every second row.

Hydrangea A.G. and P.G. should be spaced in not less than eight foot rows. The *Deutzias* and *Opuloides* type of *Hydrangea* can be spaced in much narrower rows — five feet or less. Spacing in the row itself is not important except that the stock should present a fairly solid hedge effect before layering. We use two feet on *Hydrangea* A.G. and P.G., eighteen inches on *Deutzia* and three feet on *Blue Hydrangea*.

SOIL TYPES: This is one of the most important factors in the whole operation and if the proper soil is used, irrigation will be found neither necessary nor desirable. A soil must be used that is sandy enough to work easily

with a common long handle shovel and at the same time maintain moisture within an inch of the surface at all times. Our soil is that sandy loam known as Chenango Loam and is highly adapted to this process. I am firmly convinced, however, that a wide range of soils can be used with the aid of irrigation. The only drawback being that this adds expense to an otherwise inexpensive method.

TIME OF LAYERING: This is the phase of the process where we begin to depart from the conventional methods. We are very particular to start layering just as soon as the subject has enough growth to permit it. Of course, fertile soil with plenty of nitrogen will stimulate growth and may make it possible to layer several days earlier than stock grown on soil with mediocre fertility. In the case of Hydrangea A.G. and P.G., in our area we get them down between June 1st and 10th. Other subjects about ten days later.

Now this early date of starting the process is very important from three entirely separate angles. First, moisture is important for the first few days or weeks after layering. In our part of the world, at least, the chances of optimum soil moisture, especially where the soil has been disturbed, is much better in the month of June than in later months. I have seen layers put down the first of July on a dry year that failed to root entirely.

Second, it is important in our mass production procedure to catch the stock before it has any tendency to harden or grow brittle toward the base. We are going to mound layer these plants and a few days makes a lot of difference as to whether this is possible or whether the layering has to be done nearer the end of the canes. When young and tender these canes can be bent at any place along the entire length of the cane.

Third, early layering means a more balanced layer in the end because all additional growth made by the canes, both in caliper and length may be useful. It makes a stronger plant and is much easier to handle.

PROCEDURE: Our first move is to plow up to the rows with a hitch design as first standard tractor with two bottom plow of the three-point introduced by Ford-Ferguson. With shallow plowing and plenty of speed, a table about three feet wide can be built with just one round about each row. On subjects that are spaced in narrow rows it is necessary to build this table with hand shovels but we are fortunate that those subjects in narrow rows do not require as great a table as such subjects as Hydrangea A.G. and P.G.

After this table is built it is a simple matter for one person to hold down a large number of canes at once while the second person applies the soil in small quantities with a hand shovel - just enough to hold the canes down firmly. No pressure is required and with some experience a pair can move along at a rapid pace, layering several thousand a day. No wounding of the canes is necessary.

Now it is quite obvious that we are not putting enough soil on these canes to retain moisture and produce roots - that is not our purpose at this stage. These canes are now in a horizontal position and well up on the table of soil that we have built. Within 24 to 48 hours these tender canes will have again assumed a vertical position, held down at the base by our small amount of soil.

FOLLOW-UP: After the canes are again vertical and still growing vigorously - not more than a week after the initial layering, comes a very

important duty: that of placing additional soil at the new bend of the canes that we have produced. This is not a difficult nor tedious procedure. One shovel full of soil can well cover several canes at a time. However, it is important that plenty of soil be placed at the bend because this is the point at which we want the most roots produced.

We generally use a spring tooth harrow or small disc harrow between the rows before going into the beds the second time in order to produce plenty of loose, pliable soil. This last moving of soil about ends the real work involved. On some items such as the Hydrangeas, a stripping of the blooms later in the season is necessary, especially on P.G. If P.G. are not stripped or cut off they will produce a very crooked layer.

We have accomplished all this in the month of June - late enough so that weeds present no real problem for the balance of the season except that crab grass and pigweed are sometimes a problem. Herbicides have helped us some with this latter problem if applied at the right time. However, we have come to disregard crab grass to some extent because we have found that it has little or no effect on the end result.

GATHERING: We like to take up the layers in the Fall if possible but are not always able to accomplish this. If we fail, there is no damage done and we will take them up in the early Spring before the buds break. In taking up the layers, just a light disturbing with a fork is all that is desired. The actual lifting is done by grasping a group of canes in the hand and with a light pair of pruning shears cut the canes back to the point where they originally started from the parent hill. The stock is then taken to the storage and worked over at our convenience. The surplus cane at the base is cut away so as to produce a layer that has an optimum amount of root. If too much cane is left below the bend, it will provide a point that will break or split easily even after two year's growth in the field. After the layers have been worked over and tied in bundles of fifty, we usually heel the stock in until planting time.

PREPARING BEDS FOR THE NEXT CROP: About all that is necessary is to remove the mound that was produced the previous year and do some small amount of pruning on the parent hills. We try to do this as early in the Spring as possible to prevent any possible injury to the new buds that may be in the process of forming. We use a crawler type tractor with a drawbar that is offset so that a walking plow can be drawn about anywhere one would like to place it. In this way we can produce the equivalent of a back-furrow in the center of each row and it is possible to narrow the mound down to the width of the parent hills themselves - sometimes as narrow as six inches in the case of Deutzias and other smaller plants. It is then only necessary to draw this ridge down with hand hoes. We work up the back-furrow with tillage tools so that when the job is completed the bed is perfectly level.

Additional pruning consists only of taking off those canes that are obviously unnecessary or undesirable.

We use the crawler type tractor because we have one and it is sure-footed in working on these mounds. However, I am sure that a small wheel tractor could be used with a minimum of trouble.

COSTS: I am afraid that this is the point where I cannot give very accurate information. How much per thousand does it cost to produce this planting material? I can only give a vague guess. So many small operations scattered throughout the year are difficult to keep records on but my guess would be that in 1954 it cost us between \$15.00 to \$25.00 per thousand to produce these layers, depending some on the variety concerned.

We now produce more planting stock from softwood cuttings than from layers because we are working with many subjects that do not layer readily. We have developed a method of producing planting material from softwoods in western New York that would be of interest to this group in some future discussion. We think it cuts the costs way down from the conventional methods in common practice. However, from information that we have gleaned in working with softwoods, we know that we can produce layers at a much lower cost. Also, comparisons in the field thereafter are usually very pronounced in favor of layers.

The fact that the items that we have discussed today are now plentiful on the market and at reasonable prices is no accident. Five or ten years ago such was not the case. Once again modern methods are cutting the costs and making it possible to produce this stock cheaper than ever before. (Applause)

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MR. JAMES S. WELLS: (D. Hill Nursery Co., Dundee, Ill.): What feeding do you give the stool beds each year?

MR. CONGDON: Well, we don't have a very cut and dried procedure. When the mounds are pulled out in the spring, we like to go down there and roll with the manure spreader. In addition to manure, we use superphosphate. Then we add ammonium nitrate, I would say at the rate of 200 to 300 pounds per acre.

MR. LOUIS VANDERBROOK (Vanderbrook Nurseries, Manchester, Conn.): Do you have to replace your stool beds? How long have you worked the stool beds?

MR. CONGDON: We have never replaced any of our stool beds. The oldest one we have is ten years old.

MR. VANDERBROOK: Your stock is held in - you have stripped your blossom off rather than cutting?

MR. CONGDON: No, from the fact we layer them so early, we are able with Hydrangea P.G., which I believe you are referring to, to cut back that cane by 3 to 4 inches, and we have destroyed that part that had to die back

MR. VANDERBROOK: When you strip that block by hand, you say heel it in the next spring. You don't get any rot on that tip?

MR. CONGDON: No, we never have.

MR. HOOGENDOORN: Have you ever tried almonds the same way?

MR. CONGDON: I never have.

MR. MARTIN VAN HOF (Rhode Island Nurseries, Newport, Rhode Island): Have you ever tried to stool malling apple stock?

MR. CONGDON: I always thought that was a good field to get into, but I have never tried it.

MR. WELLS: One comment and one question. The age of stool blocks seems to be unlimited from what Jack Hill and I saw down at Chase Nursery recently, where they showed us beds of *Magnolia soulangeana* that had been used for 35 years. I was interested in your comment on cuttings of *Philadelphus coronarius*. Would you like to go through the procedure and say how you root them and with what results?

MR. CONGDON: We, of course, have tried rooting those items from hardwood cuttings in the field, and as you know, having been at our place, we have these complicated five-row planters in which we can go across the field and put in approximately 10,000 cuttings an hour. We thought if there was some way of bleaching these cuttings that did not root with a good percentage, that perhaps we could get better results, and so we established this stock block of variegated weigela and *Philadelphus coronarius* with the intention of mounding them instead of layering them, and bleach the ends of the cuttings. That is done at the end of June also, but we do not secure, at least in our climate and with the methods we use, exactly a rooted layer. In other words, it is not a type of material that you would want to go out and plant in the field in the regular spaced row. So we take those cuttings and place them into 18-inch rows very close together with our multiple row planter and get a very good stand. I would say we will have somewhere between 65 and 85 per cent, which we consider good for *P. coronarius*.

MR. HOOGENDOORN: You say you don't use irrigation on that. You must have a high water table.

MR. CONGDON: No, I wouldn't say so .

MR. HOOGENDOORN: You get a dry summer and your soil is as dry as dust. How do you expect it to root?

MR. CONGDON: The soil maintains moisture within an inch. On the *Hydrangea* P.G. we produce 65,000 to 80,000 cuttings a year and we can depend on it regardless of the kind of summer and regardless of the rainfall.

MR. WELLS: Will you explain again your technique of layering the first growth?

MR. CONGDON: In the case of *Deutzia* and the *Lemoine* type of *Hydrangea* we cut them back to the original plant each year. However with *Hydrangea* P.G. and A.G. it takes a couple of years to get the stock block to the proper condition for a mass production of layers. The reason for this is that the original canes are put down. These are about two feet in length and they are a part of the permanent bed. They stay down. By removing the soil each year, we keep them from rooting. We don't want them to root out that far. However the canes are there, the nodes are there and the new layers are produced each year. In other words, each node will produce two layers because they will come from both sides of the node. Each year we cut the layers back to the original cane, but not back to the plant itself.

MODERATOR COGGESHALL: I'm sorry, but we must stop now. Thank you very much Mr. Congdon.

The next speaker on the program is Mr. John Bogdany, South Norwalk, Connecticut. Mr. Bogdany's topic is one of great interest. It concerns the rooting of *Juniperus virginiana Canaerti* and *Juniperus virginiana Keteleeri* from cuttings, which as you know, are notoriously difficult to root. At this time I would like to present Mr. Bogdany.

THE ROOTING OF JUNIPERUS VIRGINIANA CANAERTI and JUNIPERUS VIRGINIANA KETELEERI FROM CUTTINGS

JOHN BOGDANY

The Stephen Hoyt's Sons Co., Inc., New Canaan, Connecticut

We usually trim our understock in March, or our stock plants of juniper in March, and it may seem strange to you propagators that we start our cuttings the last week of January - kind of late. In fact we haven't anything in the greenhouse yet. Even the old stand is in there.

We use a coarse sand, and we control our hot-water heating system pretty well. I use Hormodin No. 3 on these varieties, and it seems to root the *Canaerti* well. We use a sweat box and wet it down to within a quarter of an inch from the bottom. We get good results with *Canaerti*, up to 75 per cent. With *Keteleeri* we get only 33 per cent, however, I have tried it only twice.

I know Jim Wells uses some sort of tripple razor blade to wound the junipers. I haven't tried that, but am going to this year.

Over the benches we have laths spaced about an inch and a half apart. We don't use whitewash until almost May. On the west side we have a double row of cheesecloth tacked up. On the east side only one row to keep out the sun. We spray the cuttings about 9:00 o'clock in the morning.

A lot of propagators don't like to give air. We give air almost every chance we can. Sometimes in the winter the ventilators will be frozen, but we try to get them up to air our greenhouse.

On *Canaerti* we sometimes get a big callus and no roots. They stay alive a long time and you can stick them over if you wish, however, we didn't count those in the percentages mentioned here. I feel it is worth while to grow these two junipers from cuttings, that is, to root them instead of grafting them.

We usually pot our cuttings. We don't put them out into the field. They are potted up and put into a frame, mulched with sand and peat. They stay there until the next June. From there they go out into sections, and it seems as though we don't lose any, once we root them. Of course, the second year we try as much as possible to shake them up.

There are some rooted cuttings in the exhibition room which I believe some of you may be interested in (applause)