# Rooting American Holly from Softwood Cuttings
# Cold Frame Method

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## SOME FACTORS INVOLVED—PROCEDURES

1. *Drainage*

Free drainage—tile drain—18-inch excavation. White, washed, building sand fill if fog nozzles are to be used. Otherwise top four inches one-third peat moss and two-thirds sand.

2. *Soil Cable*

Optional. Not necessary if other conditions are very good. Advised to be installed for emergency. Thermoswitch readily adjustable without removing from soil medium. Easy adjustment of thermoswitch. Cover thermoswitch above ground with inverted plastic bag. Thermoswitch adjustable for temperatures from freezing to at least 70°F.

3. *The Cold Frame*

Cement block construction recommended. Not wood.

4. *Sashes*

Flexoglass more expensive in long run than glass. Hinged or sliding sashes reduce labor. 3 ft. by 4 ft. sashes easy to work under.

5. *Humidity and Water*

Humidity 100%. *Low pressure* fog nozzles recommended. On during day—off at night.

6. *Light Intensity*

Variable. One-fourth to one-third light recommended.

7. *Ventilation*

Open sashes a few minutes each evening *before* fog nozzles are turned off.

8. *Air Temperature*

Up to 90°F. Fluctuations of temperature not desirable. White-painted sashes plus fog nozzles reduce fluctuations and extreme heat.

9. *Type Shade*

Natural shade steadies and reduces air temperature, but roots enter frame and interfere with drainage.

10. *Soil Temperature*

Not less than 70°F. until roots are well formed.

11. *"Rootability" of Parent Tree*

Juvenility a factor but not critical. Vitality a factor but may not be critical. Unknown factors may be lumped under inherited "rootability."

12. *Type Cutting*

New wood—not soft, curled tips. Stout rather than spindly growth. Not sucker shoots.

13. *Time of Taking Cuttings*

July to February. Middle of August recommended.

14. *Method of Taking Cuttings*

Entire new growth. Place at once in moist sack.

15. *Storing Cuttings*

The less storage the better. Never store in water. A damp sack placed in a dark, moist, cool place.

16. *The "auxin" or "hormone"*

Manufactured products not preferred. Prepare fresh each season. Store, sealed, in refrigerator. To prepare: 3/20 grams indole-3-butyric acid crystals dissolved in a beaker containing 18 cc of 95% alcohol. Add 20 grams talcum powder (unscented). Stir to a paste. Allow to dry several days. Pulverize with mortar and pestle. This powder is a little stronger than Hormodin B-2. Acid crystals may be obtained from: Fisher Scientific Company, Pittsburg, Pa.; or Distillation Products Indutries, Rochester 3, New York.

17. *Preparing the Cuttings*

With sharp knife prepare 3 to 4-inch cuttings. Ends, center, and base of new growth may be used. Remove with knife all but 2 or 3 leaves. Don't mutiliate bark. Drop each prepared cutting at once in a pail of water.

18. *Application of "Auxin"*

As each cutting is set, dip about ½ inch of the base in the powder.

19. *Planting Depth*

Shallow—about 1¼ to 1½ inches.

20. *Spacing*

Modify according to needs. Rows 6 in. apart, leaves pointing across the rows, leaves touching neither the sand nor each other.

21. *"Hardening Off"*

Procedure optional. After roots are well developed about middle of October, transplant to light soil (very well drained), reduce water and temperature. Don't let plants freeze during winter.

Will you turn to page two, Item II? I think that it is an important item. Before starting to root holly, select a highly "rootable" parent tree. Some clones root better than others. There is much variability over and above juvenility and vitality. Some trees apparently inherit high "rootability".

To illustrate: In West Virginia, there is a little tree in the wild. We call it the Helvetia holly. The top was taken off by vandals. It has grown under heavy shade. It has poor vigor, judged by the length of annual growth. There isn't any central leader. The tree nearly died two years ago. It has, however, rooted 100% four years in a row. Then there is the Brooks holly, probably more than one hundred years old, which roots 90 to 95% year after year.

The first job, then, is to select a clone that will root.

The twelfth item is the type of cutting to take. I don't think type

is critical, but soft, curled tips are undersirable. I prefer a stout, rather short cutting to a long, spindly one; and I don't take sucker shoots.

Item 13. The time of taking cuttings is not critical—from July to February. Maybe one could root them in May. But I do think that cuttings taken August 15 will root with a high percentage and will have time for the roots to become well established before winter sets in.

Item 14. Method of taking the cuttings. I take the entire new growth, if it looks healthy, and place the cut shoots at once in a moist sack, but not in a pail of water. If shoots stay in a pail of water, the leaves become water-logged. One year I set out about four hundred water-logged cuttings, and they defoliated.

Item 15. Storing of cuttings. The best way to store cuttings is not to store them. In other words, the quicker one can get them off the tree and set, the better. If cuttings must be stored, it is satisfactory to put them in a moist burlap bag and keep the bag in a cool place where there is aeration.

Item 16. The auxin or hormone. I prefer to prepare the hormone powder myself. A commercial company can procure good quality indole butyric acid crystals. This is an advantage. On the other hand, I have asked several chemists about storing the talc mixture. Most of them say that although they don't know how long one can store the powder, it is safest not to carry it from season to season, and that for even short storage it should be kept sealed in glass and under refrigeration. Commercially prepared powder may be old and is sometimes kept in a warm place. Hence, I always prepare my own hormone powder.

When one mixes his own hormone, he also has an opportunity to prepare exactly what strength he wants. The 1—150 mixture I recommend is in no way critical. My objection to a 1—100 mixture is that it may burn the cutting, but I have had stems turn black when I used a 1—200 mixture. This blackening may or may not have been caused by the hormone.

Item 17. Preparing cuttings. I think this is one of the least critical procedures in rooting holly. As an example, a farmer once showed me how he had torn a small limb from a bush, balled the base of the limb with mud, planted it, and produced a healthy plant. This may or may not be good procedure. I, however, prepare my cuttings with a sharp knife and make them three to four inches long. A nice shoot will make two, three, or sometimes four cuttings. I can see no difference in growth habits between terminal and basal cuttings.

Item 18. Application of the hormone. I dip cuttings into the acid powder about half an inch. The cut surface of a newly prepared cutting, when exposed to the air, oxidizes quickly and turns brown. This may be avoided by dropping each cutting, as it is prepared, into a pail of water. Do not store the cuttings in the water but use them at once, dipping each cutting into the powder when the cutting is removed from the pail.

Item 19. Planting depth. Planting depth is important. I set the cuttings about an inch and one-quarter deep.

Item 21. Hardening off. I think that rooted holly cuttings should be given a rest period because nature gives holly trees a rest period. On the other hand, rooted cuttings may be damaged by freezing. As an example, all of my rooted cuttings died of winter injury two years ago.

A deep snow had fallen soon after the cuttings had been hardened. After warming the cold frame, the heavy snow melted quickly, and then the temperature dropped below zero. The bark on the cuttings was split. Cuttings should be kept from severe freezing and from sudden changes of temperature.

Now back to the beginning of the paper. Item 3. Cold frame. I recommend cement block construction of a cold frame and not wood. I tested a wooden frame for three years beside a cement block frame. Consistently the wooden frame rooted holly about 20% lower than the cement block frame. Perhaps it is a matter of ventilation.

Item 4. Sashes. I feel strongly about wasting labor since I have to construct and care for my own cold frames. One of the things which irritates me most is handling a 3x6 ft. sash. I break the panes—lose my temper. Also, under a large sash, one cannot reach the middle of the cold frame and hence damages the cuttings while caring for them. Under a 3x4 ft. sash, on the other hand, I can reach the center of the cold frame even though my arms are short.

Item 5. Humidity and water. In my opinion this item, along with Item 1—Drainage—comes as near to being *the* cause as any one factor listed. Fog nozzles give high humidity and excess water. Therefore, because of the excess water, they should be accompanied by free drainage. They also save labor. When I come to work in the morning, I lift the cold frame sashes and leave them up a few moments. While the sashes are up, the fog nozzles are operated. Then I close the sashes, leave the fog nozzles on, and go about my work. At quitting time I lift the sashes again, wait a few minutes with the fog nozzles on, and then shut both the nozzles and the sashes for the night. This is the only care the cuttings receive, except that I keep trash removed from the cold frame.

I believe that holly and azaleas, and many of the rhododendrons, like water running in and out. Frankly, Jim, I am scared to death of fog nozzles used over very much peat moss. You aren't? Remember, Jim told us that he had to replace peat moss. Why?

PRESIDENT WELLS: Can you tell me?

MR. PEASE: No, I don't think so, but I will try, Jim. May I?

PRESIDENT WELLS: By all means.

MR. PEASE: We don't see that peat moss breaks down rapidly, but it starts breaking down at once. This break-down has two effects: the peat moss packs and causes the water to settle, and the packed peat moss interferes with aeration. My rooting results improved when I changed from one-third peat moss and two-thirds sand (under fog nozzles) to white, washed building sand without any peat moss. I maintain drainage and humidity and excess soil water simultaneously. To obtain the drainage I excavate eighteen inches, lay drain tile, and fill with sand or very light soil—preferably sand.

Another point. I see no advantage in removing the sashes if fog nozzles are used. The nozzles are erratic then, especially in the wind. Because I use low pressure nozzles, each one will cover a circle only three feet across, with the sashes raised. With the sashes closed, however, they cover everything in the cold frame.

To return to my talk. Item 2. The soil cable is not needed except in an emergency. Cuttings set this year on August 15 were inspected after

28 days and had developed root systems. These rooted cuttings could have been carried into the rest period without bottom heat and probably would have developed secondary roots before resting. However, no matter how careful one is, holly cuttings will root slowly in some years, and by October 15 there may be only callous formation. Unless one has bottom heat available such cuttings probably will be lost. Hence, soil cable should be installed for such an emergency.

Item 9. Type of shade. I have mentioned in the outline root interference under natural shade but have not mentioned that natural shade reduces the air temperature. Holly doesn't like extremes of temperature. I like to keep air temperature in the cold frame under 90°F. This is not difficult with the use of fog nozzles, with shade strips and sash frames painted white, and with the cold frame located in natural shade such as is furnished by the north side of a building.

Item 10. Soil temperature. I was once told that indole butyric acid wouldn't work at less than 70°F. Let's leave that to the chemists. That is why I keep soil temperature at a minimum of 70°F.

Thank you very much. (Applause).

PRESIDENT WELLS: Do we have any questions?

MR. H. M. TEMPLETON, JR. (Winchester, Tenn.): I would like to say in Tennessee we are having success with all holly, and incidentally, with *Ilex opaca* we are apparently doing everything wrong, but it works. We root in soil which is clay, a pretty heavy clay, a little sand mixed with it to make it work easier. It is essentially on the surface of the ground, a slightly-raised bed, with a temporary greenhouse erected over it, a very simple, light temporary greenhouse.

We use fog nozzles down the length of the house, which is only 14 feet by 3 feet high.

PRESIDENT WELLS: This gentleman has something quite interesting to say. He was talking to me about it. I think if he cares to describe his method of rooting not Ilex but other plants, it would be of interest to all of us. Perhaps you might like to start again, sir.

MR. TEMPLETON: The house is sheet acetate and wooden frames, with beds four feet wide, 48 feet long. The total height of the little V-shaped roof is 3 feet, which gives room to distribute mist underneath. The fog nozzles, well, they are not fog nozzles, they are spray, low pressure operating on 40 pounds, throwing water rather than mist. We put cuttings in in the simplest way, chop up the pieces, treat them with Hormodin No. 3, get the clay dirt nice and muddy and stick them in about an inch deep, turn on the fog nozzles and give them about 50 per cent light, and leave them. They stay there. We put them in in September. We leave a little shelter over and leave the spray nozzles on. The spray nozzles are under automatic control. In September, they will run possibly 2 to 3 hours a day on and off. In the middle of the winter, some days they never run at all, some days a tenth of an hour, sometimes two-tenths. By spring, we remove the whole installation, give them a little shade and just let them grow right where they rooted.

After hearing this excellent talk, it seems I am doing everything wrong with possibly three exceptions. I am giving them plenty of water. I want to have free water left on all the time, if possible. That seems to

be necessary. I am treating them with Hormodin No. 3, which probably isn't quite strong enough, and I am using juvenile wood which I consider of the utmost importance. Other than that, everything is wrong, but by success I mean in the 90 per cent range. It is cheap. It is simple. We don't have to handle them. They grow there and make nice growth the *next season. Understand, they freeze in the first winter, sometimes even* before they root. They begin to root in 23 days and continue to root all winter and some of them finish rooting the next spring. Thank you. (Applause).

PRESIDENT WELLS: I don't know why there are any nurserymen left up north. These fellows down south seem to be doing impossible things.

MR. FRANK TURNER (Berryhill Nursery Co., Springfield, O.): I would like to ask Mr. Templeton the thickness of polythene 1 mil. or 2 mil.

PRESIDENT WELLS: What is the thickness of polyethylene plastic you use?

MR. TEMPLETON: Four-thousandths.

MR. LOUIS VANDERBROOK (Manchester, Conn.): Jim, I would like to ask if anyone is doing anything about increasing the hardiness of different types of hollies. We tried growing some seedlings in Manchester and out of 10,000 got 15. We gave up raising holly.

PRESIDENT WELLS: Is anyone doing anything about selecting super-hardy strains? Paul, have you any comment to make on that?

MR. PAUL BOSLEY (Mentor, O.): I think you better join the American Holly Society and meet holly people. A lot of work is being done with the selection of forms and types. You will meet people who live in your section of the country and who have trees that are very, very old. From those you should propagate. Most hollies existing in the field are 98 per cent worthless. That is, worthless from the standpoint of using in a garden. Therefore, your propagation should be done from those better two per cent. There are people who have narrowed that figure down to one-hundred thousandths of a per cent. We do have fine, very hardy hollies that in our case I know have gone to 20 below zero in winters of '33 and '34 and stayed zero for six weeks. That is hardy enough for anybody in Connecticut or Ohio, most places in New York.

MR. VANDERBROOK: How do you find the two per cent? Are they registered with the Holly Society?

MR. BOSLEY: The Holly Society, unfortunately, does not have a system of registration. They should have. It is something that is needed. I have advocated it, like the American Rose Society, which has a registration. It doesn't cost much to belong. You will meet a lot of people and gain a lot of holly information. I hope that partially answers.

PRESIDENT WELLS: John Vermeulen?

MR. JOHN VERMEULEN (Nashanic, N. J.): We have grown quite a bit of holly for a number of years. I have had trouble in the greenhouse for two weeks, three weeks and sometimes four weeks with the leaves starting to drop. The callus has started to root but all of a sudden, every leaf disappears. Two years ago we had about 15,000 cuttings and we lost

at least 10,000 that way. I have not been able to find the reason. Last year we had no trouble. This year, so far, we haven't. Three years ago, I also had the trouble on Long Island. I would like to find the cause.

PRESIDENT WELLS: I will make a comment on that and Roger here has one, too.

We found exactly the same thing. The whole gamut of propagation becomes very complicated because, as Roger has pointed out, one factor may mask another and what is important at one time and in a certain set of conditions is no longer important at another time and under different conditions, and one of the values of humidification, in my opinion, is that it tends to eliminate some of the other variable factors. A plant under humidification continues in a healthy state with less variation of conditions and is more likely to root. That I believe.

Now we have found that holly, if taken at the right time and maintained under humidification, does not drop its leaves nearly so promptly or so generally as it does without it, and I think that is one of the factors. I think water as a high state of humidification is an important factor in the rooting of holly.

MR. VERMEULEN: May I ask one more? These particular years when I syringed more, I had more drop-off of leaves. Last year, I kept them the opposite. I kept them dry, and I didn't have the loss I had before. (Laughter)

PRESIDENT WELLS: I will let Roger on that one.

MR. PEASE: I won't try to answer it. I want to ask another question. How close together do you have your holly set?

MR. VERMEULEN: We stick them in rows. The rows are two inches apart or two and a half. It depends on the size of the cutting. In the row they are one inch apart.

MR. PEASE: Do the leaves touch each other?

MR. VERMEULEN: I think so.

MR. PEASE: I was going to say that if you sprinkle your holly in like hair on a dog, you may have good luck one year, but I saw 20,000 that a good commercial man, one of the best, had. Every one defoliated. Now I can't give the cause in your case, but in his case he had them so close together, that there wasn't aeration, fungus got in, and the leaves dropped. When I started using fog nozzles I didn't lose any leaves.

MR. MATTOON: Mr. President, may I comment on that? I am also doing things quite wrong in rooting holly cuttings, because I root them in a closed bench with Plexoglass top, which I lift up once a day. I have no fog nozzles in there but it remains humid because I do syringe them once a day, but I plant them close enough so I get about 100 to the square foot. In other words, they are more than touching; they are overlapping. (Laughter) And we run 90 to 95 per cent on most varieties or strains of *opaca*, English and Chinese.

In respect to holly growing up in Connecticut not being hardy, I wonder where the seed came from that was sown up there?

MR. VERMEULEN: Same region—New England seed.

MR. MATTOON: I have opaca growing in southern Vermont doing very well and it has for sometime. They are not seedlings. They are rooted cuttings taken from trees of known hardiness and I have never hand any difficulty except the deer which proceed to eat them off unless they are protected.

MR. TED E. FOULKE (Peeper Hollow Farm, Mayfield Heights, Ohio): I had roughly 10,000 *opacas* in the greenhouse this fall, put in in September and about 1500 of them were kept a little on the dry side and the balance were kept quite moist. The trees had some dropping over half of the leaves did fall, a little black stem, and I assumed there was fungus. I went back a month later and picked what I thought was good foliage, free from fungus and put in another couple of thousand. This time I sprayed them with Bordeaux and there isn't one leaf off in 30 days. Well, I don't know what it means. Is it *the* cause?

PRESIDENT WELLS: I believe timing has quite a lot to do with leaf fall. I remember seeing cuttings put in at the end of July and beginning of August, and three weeks later the whole lot was dead. The stems were black and leaves dead. They took them out and put another batch in and they were fine. I believe towards the middle or end of August is the best time. We wound all our cuttings. You have probably seen a few of them. We apply a heavy wound.

The reports in from Boskoop this year in indobutyric acid, which is three times as strong as Merck No. 3 powder, gave 90 per cent or higher rooting in frames, and we put it in and have used two per cent on all our cuttings this year and got pretty good stand. I don't know the exact percentage. Do you know it, Jack?

MR. JACK BLAUW: 80 to 90 per cent.

PRESIDENT WELLS: These cuttings were put in the end of August or September have been lifted out and put into flats to put away for wintering. As a small test, we treated 25 cuttings with the two hormones which we have been playing with on rhododendrons, labeled over there A-5 and A-10. Those two hormones are 15 times as strong as Merck No. 3 from a rooting capacity. The names on them—there isn't much time—are crack-jaw names, I can tell you. We used one per cent powder and on 25 cuttings of *Ilex opaca* we treated with A-10 we got 25 roots. The roots were not abnormal, which you might expect from a strong powder. They were apparently normal root system and a topping good ball. They have been lifted and put in flats for wintering.

MR. PAUL BOSLEY (Mentor, O.): The ability to root I think is determined a year in advance of your rooting and plants. In other words, if your holly is well fed, has the nutrients it needs and if there are no spider mites on your leaves, your chance for success is much greater than it would be with an underfed cutting. Keep your stock plants in top condition, and be sure you have a good variety to start with.

I will say that I have opacas completely defoliated at this time of the year under normal years. I judge that would be a very poor holly to propagate. That is the purpose of sexually reproducing fine types. Feeding is a big factor in there, too.

MR. HOOGENDOORN: May I ask the gentleman a question? Isn't the hardiness of your *Ilex opaca* determined a good deal by the location where a plant is planted? After all, *opaca* likes exposure.

PRESIDENT WELLS: The question, in case you didn't hear, is: Is the hardiness of *Ilex opaca* affected by the location of the plant?

MR. BOSLEY: It should be very hardy. It should be able to withstand open field conditions. We grow them like a farmer grows corn, open field and no protection whatever. If the variety is good, it should withstand those conditions. If it won't, we don't want any part of that variety.

MR. HOOGENDOORN: In their native haunt you always find them in the woods showing that they prefer shelter. That is why they are growing there. You will never find them exposed.

MR. BOSLEY: That is true, they prefer that. If we are going to propagate, it has to be a variety tough enough to withstand exposure. The Brooks Holly stands on top of a mountain. There is nothing between it and the North Pole. It has withstood it for a number of years. It is trees like that we must propagate from. There is a wide variance.

MR. MATTOON. May I comment? In Chesapeake Bay, there is an island fully exposed to the north and west that has a perfectly beautiful stand of holly. There are over 40 trees more than 24 inches in caliper. The island is three inches above normal high tide. It is frequently washed by brackish water in abnormally high tide. The holly is so dense on that island that no vegetation grows under it. The soil is principally decomposed leaves. Those trees are fully exposed with nothing between them and the North Pole, as Paul Bosley said.

MR. HOOGENDOORN: And they stand all winter.

MR. MATTOON: They have been doing it for 150 years and they are never winter-injured.

DR. SKINNER: Just one little observation. Mr. Pease mentioned the need for drainage in rooting. I just want to mention the fact that we are unorthodox in our little frame at the Morris Arboretum. We keep a constant water level at one inch to one and a half below the base. That frame has rooted more unusual stuff. It even does with holly. We are old-fashioned because using that system we don't have to put in fog nozzles. It is a little trick that works with us. I don't suggest generally you go into subirrigation. Some of you have probably tried it and failed. Whatever technique works for us is the one we like to use.

I might also say generally we put holly in vermiculite and peat about the middle of December in closed cases with watering or spraying more or less when we think of it. Under those conditions about all the hollies will usually root before the end of January. And again, it is a little trick that suits us.

PRESIDENT WELLS: Thank you, Henry.

MR. WILSEY: Mr. Wells, do you find any varieties that root more readily than others?

PRESIDENT WELLS: No. Now, of course, we are at fault here that we haven't any of the recognized *Ilex opaca*. Somebody in the dim past must have gone out into the woods and collected what looked like a good holly. We have 15 trees 15 or 20 feet high, a dozen with good form and glossy leaves and we propagate from them. We have one big male tree. There is certainly no juvenile wood in the cuttings we take. We take

ripened wood from current season's growth and are having quite reasonable success.

MR. FILLMORE: A question for Mr. Pease. I would like to ask if he just uses common talc in preparing hormone powder or does he use a specially fine ground?

MR. PEASE: I just go to the drug store and ask for unscented talc. I am careful when I mix it with the pestle to make it as fine as I can.

PRESIDENT WELLS: We mix up quite a lot of our hormones and we buy our powder from Merck. They won't sell you the hormones but they will the talc.

MR. VANDERBROOK: I would like to ask Mr. Pease if in putting your cutting in the medium you put it in solid or loose?

MR. PEASE: I put them in the medium and press around with my fingers and then before I turn the fog nozzles on, with a hose without a nozzle that is giving a stream perhaps as big as a lead pencil, I flood around and under the leaves.

MR. ARTHUR LANCASTER, JR. (Portsmouth, Va.): I am interested in the dropping of leaves of *Ilex cornuta*. Quite a lot of people are having trouble with that. So are we. Last year, because our temperatures are moderate we don't need much heat in our greenhouse, so we installed gas heaters. We didn't know just what the results were going to be. The hollies callused and were about ready to break, when the leaves turned yellow and dropped. I was under the assumption it was due to the gas. Since others are having the same trouble, I wonder if it was gas.

MR. PEASE: There has been published a very good bulletin at Corvallis on the "Effect of Ethylene Gas on Holly." This gas does make the leaves drop both on English holly and American. You probably had a special case, but there are other things besides that which will cause drop, without question

MR. HENRY B. METZELAAR (W. H. Corning Estate, Mentor, O.): I want to hear about subsequent care of these little hollies after having put them out in frames. How soon can you set them out? Suppose you want to plant them away from where you can take care of them, how soon can you do that after you have set them out in a frame?

MR. WELLS: We root our cuttings from the middle of August to the end of September, when cuttings are lifted, they have a primary and secondary root system. They are lifted and heeled into flats in the same rooting medium and left in the greenhouse until they get established in the flats. Then they are moved outside into deep frames where they have protection of depth sash, where they stay until spring. We plant them out early in the spring, by machine.

MR. PEASE: I would like to make an observation along this line. I think that it should be possible to grow hollies taller, with nice dark green leaves, the first year. The next year a little more, and the third year have a nice plant. I wonder if anybody has tried growing holly under a cheap overhead irrigation.

MR. FRED C. GALLE (Horticultural Department, Ohio State University.) You can get them up 18 to 24 inches under a lath house the

first year under irrigation, then take them out into the field and develop your plants from there.

PRESIDENT WELLS: Did everyone hear that? That is quite an important observation, I would say.

MR. PAUL BOSLEY: One thing I would like to mention, that is, having fresh fruit any place around your hollies. If you cut holly and bring it into storage don't have any fresh fruit in that same storage house or the leaves will be off your holly in a few days.

PRESIDENT WELLS: What kinds of fruit?

MR. BOSLEY: Apples particularly.

MR. PEASE: That goes back to this bulletin I was referring to a minute ago. Any fruit, according to it, will give off just a trace of ethylene gas. It affects the abscission layer. That accounts for your statement, sir. Any fruit will do it.

DR. SNYDER: May I make a point of observation? Apples are not the only thing that produces ethylene gas. They have found in the storage of cut flowers many of the flowers themselves produce enough ethylene gas to cause a complete abscission of all floral parts. That is the biggest problem they have run into with cut flower material. If they put in activated, brominated charcoal it will absorb the ethylene and they do not get the abscission. Likewise, if you store materials with carnations and other materials you will get a lot of abscission. Ethyelene apparently, at least one theory is, it stimulates the growth regulator in the floral parts, in leaves and causes abscission. This business of apples and holly fits into the pattern generally known.

PRESIDENT WELLS: Gentlemen, what is your pleasure? We have been sitting here quite a while. We are supposed to have a clinic to wind things up. I don't know whether we should have that or adjourn the meeting or continue this discussion until we all fall on the floor. What is your please?

MR. HESS: I move we adjourn the meeting.

. . . The motion was regularly seconded . . .

PRESIDENT WELLS: Before we adopt the motion, I would like to make one or two closing comments. I think that during these past two days we have seen the spirit of that Plant Propagators Society in action as we had all hoped to see it. We have seen the free and very pleasant and happy exchange of information we had hoped to obtain. I think you will all agree we have had some pretty good meetings and it typifies what all of us had in mind when we started to get together a year ago. It also typifies what we hope to see in the future.

Nothing could be better I think than what we have had yesterday and today, but of course we shall try to make it better. A gentleman came up to me and said, "In your scheme of things, what about the amateur?" Of course, we are not an amateur society. That doesn't preclude a keen and vigorous amateur becoming a member in course of time if he wishes, and I suggested to that gentleman that he should register as a member or as a prospective member and eventually if he had the time and experience he should apply for full membership.

I would like to put another idea before you. We plan to be active, one proposal is that this society shall make it its responsibility for collecting information on a given plant or a given group of plants, considering historical references, making abstracts where it seems advisable to do so, and perhaps eventually publishing a monograph or bulletin, giving all the pertinent information. If we get into it, we are going to have a job finding people to do the work. It is no small job to tackle a thing like that. We might perhaps have to pay someone to do it and finally, we might publish those results either as part of our proceedings or as a separate monograph, if it seems justified.

That seems to me to be something very well worth while. We are not trying to run before we can walk. We are just trying to get ideas and I would like to have your reactions to this suggestion at this time. I do think that such a work would be worth while. Would it be of interest to you?

MR. FLEMER: Since the various groups of plants are taken up year by year, only one or two groups a year, shouldn't the bibliography be limited to just those groups and appended to the proceedings?

PRESIDENT WELLS: That is what we had in mind. We may not be able to tackle this for a year.

What I really wanted to get down to is this: Do you think the idea is really worth while? Would it be what you would like to have as a service from your society?

MR. HUGH STEVENSON (Forest Keeling Nursery, Elsberry, Mo.): Yes, I think so. I don't know of any ready reference on propagation of any of these items. The texts that are available are very old. I know of no recent bibliography as an index to where we could secure written material on any given subject. It seems to me it would be of inestimable value to a propagator. Your committee will have to decide how far we can go with the money available but in so far as any progress can be made or a complete bibliography can be made, when funds are available to make it, it would be valuable to a commercial propagator or professional man.

I would like to speak on one more point. There isn't any real good propagation textbook—that is no reflection on some—that is very complete on propagation matter Even one of the most useful nursery texts by Chadwick has been out of print for about 15 years and it is about 25 years old, so there isn't anything that has recently been brought together of the form we are talking about, and we need it.

MR. GABE SIMON (Medina, O.): I would like to suggest that since we have several universities and schools represented here that maybe one group of plants could be assigned to each school and these schools endeavor to work up all the information available on one particular group of plants.

PRESIDENT WELLS: We can put that suggestion to our committee and see if there are any high-minded public officials prepared to accept the task.

Might we have, very briefly, some suggestions of what plants you would like information on? If you could choose one, which one would

you choose? Does anyone have any suggestion on what plant they would like to have dealt with first?

MR. C. PAYNE?: I would like to know about grafting Koster spruce.

PRESIDENT WELLS: I will give this gentleman the information direct.

Do we have any further comments?

MR. JIM ILGENFRITZ: I have certainly enjoyed these last two days more than most any meeting that I have ever attended and during the time I have felt that I have been walking with the great and near great in the horticultural world. Why cannot we have immediately after registration at each of these sessions a mimeographed list prepared of those present to be circulated to the whole membership, giving the name, address, principal occupation, business connection, and such other information as is pertinent, so that each of us may more easily seek out the man we want to talk to. I think it would be rather helpful.

I would like to also point out that in all of the discussions here in this room not one single word has been said about hardwood cuttings. That is our bread and butter method of propagation. I would like to hear a lot about that next year.

Finally, I believe there is a lot of enthusiasm here on the part of many of the members to do some good by imparting such information as they have, to have all of those people say all that they have to say in a three-day meeting next year is going to be impossible.

I suggest that those interested prepare papers during the year and submit them to some committee who may pass upon them and either see to it that those papers are published prior to the meeting or are in some manner disposed of as befits their value. (Applause)

PRESIDENT WELLS: That seems to me to be an excellent suggestion and I am quite sure that the executive committee will warmly welcome any papers that anyone may wish to prepare. We are already thinking of next year's program. We have one or two tentative speakers lined up and if anyone has anything that he would like to say, either verbally or in writing, please do let us hear from you.

This brings up one last point. I promise you it is the last. The question of whether we should have a summer meeting. There has been a suggestion that we should have a meeting associated with the A.A.N. in New York. It is suggested that we might arrange a tour in some of the nurseries in New Jersey and perhaps down to Beltsville. Is it your pleasure that we try to organize an auxiliary meeting to coincide with or come just before or after the A.A.N. meeting in New York? What is your pleasure? Hands up, those who would like to have a meeting in New York. (Practically none) I think that settles the question.

Well, gentlemen, I thank you for your forbearance. I am very glad you were able to come. We will look forward to seeing you again next year.

. . . The Second Annual Meeting of Plant Propagators adjourned sine die . . .

ADJOURNMENT