

and one that is being unloaded. Upon reaching the unloading area a jeep leaves the loaded trailer, picks up the unloaded trailer and returns to the canning machine where a loaded trailer is ready to be taken away. We find a canning crew of 10 people, including all of the above operations, can handle from 10,000 to 12,000 containers a day.

The two gallon, and five gallon or egg canning operations at our nursery are done by hand. The soil is put in the containers with shovels, compacted and the hole punched by a hand machine. In the meantime, a small crew has been removing plants from one gallon containers by inverting the can and tapping it against a solid object. If the soil in the one gallon container has been thoroughly watered it will come out of the container without any disturbance of the root ball. In some instances the can is cut away, especially when grafted plants are being canned into a larger size container. The same type of jeep drawn trailer is used in this operation as has been described for the one gallon canning operation.

The general conception of a finished plant in California is one that is bushy and well filled out rather than a plant that has been allowed to grow without much pruning. By the time a one gallon container grown plant has reached the finished stage, we have pruned it at least ten times and this figure is almost doubled when it is grown on in the five gallon container..

The procedures of container production outlined in the foregoing are the procedures followed by the Monrovia Nursery Company. The other growers of nursery stock in California all have their own methods of growing their stock to the finished product. Also the Monrovia Nursery Company has a full time research director who keeps a very close check on all phases of production, from the cutting or seed to the finished product.

MODERATOR TURNER: Thank you, Mr. Lee. Since we should follow the procedure that has prevailed here, we will reserve ample time at the end of these discussions for questions. So without further loss of time, I would like to introduce Mr. Arthur Lancaster of the Coleman Nursery, Portsmouth, Virginia.

Mr. Lancaster presented his discussion on container culture in Maritime Zone 8. (Applause)

CONTAINER CULTURE IN MARITIME ZONE 8: ITS SIGNIFICANCE TO MORE NORTHERN LATITUDES

MR. A. J. LANCASTER, JR.
*Coleman Nursery
Portsmouth, Virginia*

Thank you, it is indeed a pleasure to be with you folks.

First I would like to spend a moment on the conditions that exist in our area where we are growing about 95 per cent of our stock in containers. It is an area which has rainy weather, cold weather, warm weather, and hurricanes, except for this year. It is a land, as far as

weather conditions are concerned, where a little bit of everything might be had. Starting in January of this year and on through until almost the middle of March, we had what we consider a hectic winter. It was rainy and cold, the low officially, about six above zero. For us this was considered cold. Then we had all of our rain in the spring, which was followed by the worst drought in over 50 years. When you are growing in cans and you have no rain, you have got to stay with it all the time. When I look at a plant I can't help but compare the plant to a human being. I don't know if any of you ever look at it that way, but that plant is something living, something you have got to take care of. When a drought comes, it must be nourished. When a plant gets hungry you have got to feed it. When the cold comes, you have to wrap it up. If we remember there is a comparison and think of it in these terms, I think we can grow a little better plant. We are constantly trying to find out more about container stock

This year we went to California, Dundee and Mobile, Alabama. After visiting all these outstanding nurseries we came back and tried to consolidate what we found and what we have learned through experience and put it into one place. There are two things I always like to keep in mind and one is that the minute we get ourselves set, the minute we think we know something, something backfires. Never get too set in any one line of procedure. Be willing to change. Be willing to roll as the stone rolls. Secondly, the grower must have confidence in what he is doing. He must have confidence in the plant he is trying to produce.

Now let's take a few minutes to look at some of the plants we grow in Virginia. We are located right off the coast of Virginia Beach, the Atlantic Ocean, Chesapeake Bay, in sort of a pocket. The Gulf Stream winds give us a little milder climate. We also have Indian summers in February and March, followed by sudden freezes. We grow many plants that are normally considered tender. For example, 20 years ago they wouldn't think of growing a camellia, although today, it is one of the biggest camellia-growing areas in the country. The camellia is one of the main plants. As I left to come up to the convention, our fall-blooming camellias were beginning to bloom, along with crapemyrtle. Crapemyrtle is indeed one of the fine plants in that area, along with the gardenias and all the various exotics

I think the exotics grow as well as any class of plants in cans. I can't think of any plant from *Ilex camelliaefolia* to *Ilex cornuta* that wouldn't grow exceptionally well in containers. *Ilex crenata convexa*, *I. c. variegata* and various other exotics also do very well. However, there is one plant, *Ilex rotunda*, that must be handled very carefully, as it will freeze in our area. *Ilex crenata convexa* is no doubt the hardiest of all pyramidals. Crapemyrtle, which is considered very tender, overwinters without loss. (However, any plants we had in our retail yard were killed by a freeze of 25°F. if allowed to remain off the ground on a display table. Keep your plants where there is no air circulation under them.)

This year, for the first time, we rooted a number of plants under mist and were very successful. Cuttings are potted in 2¼" pots and

put in cold frames which can be covered with sash during periods of dry weather. From a 2¼" pot everything goes to a one gallon can. Plants transferred to containers in April will be ready for sale in September, although a plant transferred to a container in June or July will not be ready until the following year. Stepping up from a one-gallon container to a larger can is done in November. We have square, 5-gallon cans, Although there will be no top growth on these plants, there will be a surprising amount of root growth by February or March and the plants are ready to grow as soon as the warm weather hits. These plants will be ready for sale the following fall.

Our potting mixture is composed of about 40 per cent soil, 30 per cent peat, and 30 per cent sand. Our soil is of a light, sandy nature and quite satisfactory, since aeration is one of the most important factors in container growing. If you have good aeration, you will also have a good vigorous root system.

We have been a little slow about changing over to mechanical overhead watering. We have many of the various devices set up but still 90 per cent of our watering is done by hand. If a can is watered, the roots will stay in the can, but if the ground area is also watered they will root out into the ground. Summer care is very important. When the ground is dry, or during a drought, the container plant must be watered every day. Sprinklers can be set up as a supplementary measure, but they do not do a thorough job of watering. During dry spells when constant watering is necessary, we find frequent light fertilization best.

After losing 15,000 plants from a concentrated weed killer, we cut 6 to 10" of soil from the growing area and laid 1½ mil. black polyethylene. Some of you have this material, I am sure. On top of this we put a thin quarter inch layer of sawdust to protect the polyethylene from light and then replaced our containers. This is an unsightly thing, but by eliminating weeding between cans we cut costs by 25 per cent.

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(Editor's Note: Mr. Lancaster supplemented his talk with a set of well selected, colored slides. During this period a number of points were brought out which are included in this section.)

QUESTION: What spacing do you use for your container beds?

MR. LANCASTER: All of our beds are marked into 15 foot wide areas, having 5 foot walks. In one of our double beds we have 3,200 containers.

QUESTION: What kind of containers do you use?

MR. LANCASTER. We use only metal containers which we obtain from local sources and process ourselves. A number 10, or gallon can costs about three cents to process and an egg or square can about ten cents.

QUESTION: How do you get your plants from the salesyard to your customer's car?

MR. LANCASTER: We have boys who carry the plants to the customer's car, where they remove or cut the can. If the can is not cut or removed there is a chance that the customer would stick can and all into the ground and wonder why it didn't grow.

QUESTION: What do you charge for an item like privet, or a common variety of rose?

MR. LANCASTER: For a one gallon sized *Ligustrum lucidum* we get around \$1.75. The minute we get it into a 5 gallon can the price jumps to \$3.75 or \$4.95. We put all our roses in 5 gallon containers in December or January. When they are sold around the first of May we get about a \$1.95.

MODERATOR TURNER: Are there any further questions?

DR. CHARLES E. HESS (Hess Nursery, Mt. View, New Jersey): How much do those five -gallon cans weigh Mr Lancaster?

MR. LANCASTER: When the cans are wet they weigh in the neighborhood of 35 or 40 pounds. Styroloam will cut the weight from 40 pounds to about 22 pounds, but it requires a lot of styrofoam.

DR. HESS: The year before last we had Dr. Matkin of California here and he gave us what he considered to be the composition of a good container medium. I wonder if any of you gentlemen have used this medium of sand and peat and if so, what your experience has been with it.

MR. JACK HILL: Yes, we have used a sand-peat mix in Dundee for two years. In fact, we are now using it exclusively throughout our whole operation, even for potting or banding rooted cuttings. So far, it seems to work out pretty well. There is some question right now as to whether or not its aeration qualities are sufficient for good and rapid establishment of yews, but for the general run of conifers, which tend to be tolerant of lower aeration, there is no difficulty at all. It is a good consistent mix, and most important of all, it can be standardized.

DR. HESS: What is the weight of this mixture in the one gallon container?

MR. HILL: A one-gallon can weighs about eight pounds including the finished plant.. The five-gallon can weighs 28 to 30 pounds.

DR. KEN REISCH: Mr Lancaster, what is the time schedule on your *Pyracantha*, from start to finish?

MR. LANCASTER. We try to make most of our cuttings in the summer. The cuttings taken last July are already potted and will be canned by next April. These plants will not fruit until the second year.

MR. HILL: Mr. Lee, can you outline for this group what the California growers mean when they talk about a Pinto-tag nursery? What qualifications are prescribed for Pinto-tag authority?

MR. LEE: The Pinto-tag is a tag issued by the State Department of Agriculture. It is a nursery tag that is half pink and half green in color and it permits us to ship to any county in California (except Tulare and Ventura Counties) without reinspection of the plant. To qualify for Pinto-tags a nursery must be free of all injurious insects and

diseases. There must be no insects that are not of normal, general distribution, in other words, no aphids or scale can be on any plant. Nurseries are periodically inspected by a crew of State Agricultural Inspectors who go through our fields; literally on their hands and knees, looking underneath the leaves of the plants to see that they are clean.

MR. HILL: Are you sterilizing any of your canning mixtures?

MR. LEE: Right now we are not.

MR. JOHN ROLLER: Mr. Lee, would you go through your steps for handling *Pyracantha*?

MR. LEE. We take our cuttings all through the year. The time period from the cutting to what we term a finished product in a gallon can runs approximately 14 to 16 months

MR. ROLLER: Do you have any problem of setting fruit on your *Pyracantha*?

MR. LEE: None, other than they have to flower on the old wood.

MR. HARVEY GRAY: With your permission, Mr. Moderator, I would like the lights out so that I can project one slide. Here we see a different container than what has been in the subject of discussion this afternoon. This is a wire basket. It is not a new idea, but is old; old as containers and growing plants can be. This wire basket is hand-made from 2" x 4" turkey wire. The liner is salvaged polyethylene film. The mix is the U.C. mix, prepared practically identical to the one described by Dr. Matkin here two years ago. The plant growing in the basket is *Cotoneaster horizontalis*. It is a two-year plant, one year in a two and a half inch pot and transferred to that container in the early spring of 1957. The basket has dimensions of 8" x 8" x 8", and costs about 22 cents to make by hand

I am grateful to Bill Tish of New Jersey for this particular technique. When the plant is planted, the basket goes right in the ground. There is no taking away of any container. The only thing that needs to be done is that you slash the plastic, in order to have the medium come in contact with your freshly prepared area. There are no wires to cut for the ultimate consumer and no problem as far as your watering program. I am not saying the idea is original. I am not saying it will work in every situation, but it is something for your consideration.

MR. SIEBENTHALER: Has anyone had any experience with sub-irrigation with the idea of uniform watering and fertilization and elimination of hand labor?

MR. HILL: We have not had any actual experience with it, but I have talked to one or two people who tried it on a small scale. The ones who tried it seemed to think it was working all right, but I feel that there must be something wrong with it or they would have expanded their operation.

With containers there are problems with sub-irrigation. The number 1 problem is the cost of preparing a relatively shallow, water-tight container. You may use polyethylene there but it won't stand the wheelbarrow traffic. You have the problem of the spread of the disease

organisms. If you have one plant that is diseased it will thoroughly inoculate every other plant. Beyond that, in any area where you have moderate rainfall, sub-irrigation will tend to accumulate soluble salts. Any fertilization by the sub-irrigation method is never leached down from the top and would therefore tend to accumulate these salts.

DR. J. H. TINGA (Department of Horticulture, V.P.I., Blacksburg, Va.): I would like to comment on sub-irrigation. We have a small sub-irrigation project with container stock that hasn't gone through the winter yet. For our setup we put polyethylene down and covered it with two inches of sand. We then set the gallon cans one inch into the sand. Then we bring the water level up to the bottom of the can. Our basin doesn't fill up because it has an overflow mechanism. If we have a hard rain it just goes over the edge. So far, without any watering, we have had better growth than we have had on cans handled in the ordinary way. We are going to let them go through the winter right in the water to see how it looks before we say too much. One thing to remember with sub-irrigation is to keep the organic matter low. We use no compost or manure and only one-third peat in our potting mixture.

MR. JOHN McDONALD (McDonald Nurseries, Hampton, Virginia): I wonder why there has not been any concern demonstrated by the panel in regard to a plant producing too many roots in a container. It is not possible that a container can get so full of roots that it will be root-bound?

MR. LEE: Some plants will produce a very heavy mass of roots, and if planted, without slightly disturbing that root ball, will express a choking-like condition, so to speak. If the plant seems to have a very heavy mass of roots, the root mass should be slightly disturbed before planting. Each variety of plant has a given time that it should be in a container. Some can actually be kept in a one gallon container for two or three years, without forming too heavy a mass of roots.

MODERATOR TURNER: Thank you, gentlemen. I will now turn the meeting back to our President.

PRESIDENT VANDERBROOK: Thank you, Frank, and your panel for a most interesting session.

The session recessed at 5:10 P.M.

PLANT PROPAGATION QUESTION BOX

FRIDAY EVENING SESSION

November 22, 1957

The Plant Propagation Question Box Session of the Seventh Annual Meeting convened at 8:00 p.m. Dr. J. P. Mahlstedt, Iowa State College, was the moderator for the evening.

The transcript of this session of the annual meeting is not included in these Proceedings.

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