

MECHANIZED POTTING

MITCHELL HOYLES
California Polytechnic College
Pomona, California

The trend in all industries has been toward mechanization and the nursery industry is no exception. The mechanical operation of doing any job has proven itself to be an effective means of lowering the cost of producing a commodity. As long as man produces things, he will continue to create mechanical means to do it more efficiently.

Our senior project is concerned with the aspect of transplanting rooted cuttings and seedlings into plastic pots by machinery. This machine will automatically do all the necessary steps involved in potting. It will handle the plants, the soil and the pots.

An experienced worker can pot approximately 2500 cuttings a day. For any machine to be effective, it must do at least that. Hopefully, this machine will do many times more. In order for such a machine to operate certain theories must be examined and tested. One of these theories would be to eliminate bare-rooting the cuttings by compartmentalizing the flats. Another theory would be to treat the soil as a semi-liquid slurry and pump it into pots.

Our machine will be very simple. It will be designed merely to illustrate the principle. Before any machine can be constructed that will be competitive with hand labor, much research, testing and actual building must be done. We feel that if the principle can be effectively shown, a competitive working model will follow.

PERCY EVERETT: I think, Jolly, that you can be very proud of these two students and I would suggest that some of you nurserymen, if you're going to stay up on top of the game, better either grab these boys — or you'd better just quietly leave the nursery business. They're going to come up with some ideas that will probably put all your other mechanical gadgets out of working order.

Now at this time we will have a Question and Answer period. I'm sure that there must be a lot of questions.

DAVID ARMSTRONG: I'd like to ask Vincent Bailey what method he used for digging his plants.

VINCENT BAILEY: In the two-year, nine-foot, rows we used or designed a U-shaped digger with a lifter on it that could be attached to the same tractor that does the cultivating. We use an ordinary vegetable cultivator. Then we attach the ten-inch blade, with a lifter, and go along behind and pick up the plants and load them onto a truck. There's one farm that was bought specifically for this purpose because of the sandy loam soil.

DAVID ARMSTRONG: You're bare-rooting all your material?

VINCENT BAILEY: Yes.

LLOYD JOLEY: I would like to add, that at the suggestion of Dr. Hesse, University of California at Davis, we have successfully used slurrys around peach seedlings in transplanting from the greenhouse to the field. It works very well.

I would like to ask a question of Mr. Bailey. How do you protect your container stock during the winter at St. Paul?

VINCENT BAILEY: That's an embarrassing question. We're still doing some research on it. The University of Minnesota is very helpful. I don't think we made a dime with our production of roughly a half million container plants. We're still hopeful. We have trouble over-wintering some of the so-called hardy plants in the area; things like Pfitzer junipers that never give us any problem in the field. There's an answer, I'm sure; we're still looking for an efficient and economical mechanized means of over-wintering container-stock.

EDWARD JELENFY: In field-grown stock — how often is it root pruned or is it?

VINCENT BAILEY: Well, for instance with *Prunus cistina*, we do not root prune them in the field. They are grown only two years and we get two to three foot plants in four-foot spacing of the rows. We have tried growing them three years and find that the root system is not as fibrous and concentrated as it should be. I think we'll restrict growth to two years and transplant if we want a larger size. We do not do any root pruning of that class of stock in the field.

VOICE: Mr. Bailey, I'm curious to know what happens to your two-year-old junipers that you dig bare root until they reach the consumer.

VINCENT BAILEY: They are dug in a dormant condition in the spring, which for us is April to, perhaps, the tenth of May, and anything which isn't immediately shipped out is put in storage at 34°F., (automatic humidification, no packing) and we plant probably 50 to 70 thousand per year in our own fields, but we do have a certain amount of them to sell. You ask what happens — they go into a balling field, spaced roughly 3 by 5 or 5½ feet. In most parts of the United States this procedure is more common than it is here in California.

VOICE: Do you dig or do your balling at this specimen spacing, or can it be done by hand?

VINCENT BAILEY: We have anticipated buying one of the balling machines which was developed within 20 miles of us, but we're not sure that we will. We dug a few hundred plants this fall by hand; where you dig everyone in the row they are spaced close together. This is a new type of product for us. We're aiming at the garden center market with this three-year plant and we need a hundred per cent. The off-shaped ones will need to be thrown away or transplanted into what we call our "balling" field; it's a new type of market and we're not sure yet if we're going to use a mechanical baller or hand balling.

MARTIN USREY: Percy, I have an observation to make on

the mechanization of the cart we've built, or a potting machine, or canning machine. If any individual firm goes into it it's quite expensive. We will probably have \$20,000 in this cart we've built. If there's some way that the propagators of the nursery industry can get manufacturers to take some of these things over and produce them, they can be produced for one-third the cost — but the question is, how can we get them to do it?

PERCY EVERETT: I suppose it's a matter of demand on the part of the nursery industry and, perhaps, there are not enough nurseries in the United States that are of the large operation that your firm is, Martin.

MARTIN USREY: No, I think that there is a demand, even if this one wants one and that one wants one; say we need 25 and if you start around the country, perhaps in total the nurseries would want a hundred or two hundred. How can we get this idea over to a manufacturer to go into production with it?

ED WOOD: Well, since we heard from the immediate past-president of the AAN, we should also tie in and make this a plug for the Horticultural Research Institute, which is head over heels in this thing. It costs you \$100 a year. It's helping the industry. It's doing the thing that Martin's talking about. They are now working on mechanization needs of the industry, all the big balling machines; they are doing anything and everything you can think of — directly with Royer and the other nation-wide manufacturers — hoping to fill this void that we have from producer to manufacturer to get what we need to work with.

PERCY EVERETT: Ed, I think you and Martin better get together on this. I would imagine, too, that just from what little I know about it that the agricultural engineering departments of the universities, the state universities, work closely in this area. They certainly do in the production and the harvesting of many crops; I would think nursery products are a very legitimate crop. Undoubtedly the universities are doing something.

We're now going to continue our panel along the general area of "Challenging Techniques in Plant Propagation", by introducing a man that so many of us always says needs no introduction. He has grown up in the nursery business from the very beginning. It gives me a great deal of pleasure to introduce Bruce Briggs from Olympia, Washington. He is going to tell you about his additional work with "air propagation". Bruce —