North and they're much superior to anything we can take off, they root much better, much faster than our cuttings. *Camellia* cuttings taken off under the same conditions in California brought North. put in our greenhouses root and are much superior to anything that we can grow. Also going back to the work with "Tams", the most peculiar thing is that those cuttings taken off in California, when stuck in California did not root as good as under our conditions. The same was true for *Rhododendron* and *Camellia*.

VOICE: It must be the smog.

MODERATOR JIM WELLS: I would suggest to future program chairman that more time be allotted for discussion. I wish to thank the panel very much for their participation.

PETER VERMEULEN: I would like to introduce the moderator for the next portion of the program, Mr. Michael Johnson.

MODERATOR JOHNSON: Each round table moderator will be allowed six minutes to summarize what went on in about an hour or an hour and a half of discussion. Our first moderator is John B. Hill.

## AUTOMATION AND/OR MECHANIZATION IN PROPAGATION NEW TOOLS, PRACTICES AND TECHNIQUES

JOHN B. HILL, *Moderator*
THOMAS WHEELDON, *Recorder*

I believe that I can sum this up rather quickly by saying that the consensus indicated at the conclusion of our round table was that actually there were precious few new tools, new in the strict sense of the word. The solution to our problems lay not so much in sitting back and waiting for a latter day Cyrus McCormick to develop for us sophisticated complicated equipment to aid us in propagation or field culture, but rather to adopt the equipment we do have to do the best possible job. I define a machine as any tool we use — very simple tools such as knife or a relatively complicated piece of machinery such as the device for measuring the average $CO_2$ content of the air in a propagation house as we saw at Wooster. I'm not sure that as practical propagators we need be concerned nearly so much with the acquisition of complicated sophisticated equipment as we do better utilization of the tools we already possess. A very quick study of the understandable desires and needs to mechanize the propagation part of any nursery operation, let alone the field or container operation leads to the following thoughts. Quickly, to bring this around to one hang up point, that is in common with all food and fiber agriculture, we nurserymen are denied the single principle which Henry Ford is given credit for developing, and that is the very simple thing of bringing the work to the worker. It is impossible to put a propagation bench on an assembly line, and let the workers sit at one place and have the work pass in an orderly way. The same applies to any field

crop. Although we are denied that in our field of agriculture, we should not think that the food and fiber people are denied that. The industry is of sufficient size that it early attracted Cyrus McCormick and John Deer and the other people who have through the years developed some very elaborate and very fancy equipment to use on a highly cyclical basis. After all they are harvesting once a year most grain crops and yet the food and fiber people do possess that sort of equipment. It is unrealistic, however, to expect that type of equipment will be developed for the nurseryman. We are therefore stuck with the necessity and need for improving and more or less building that equipment ourselves. That specialized equipment that fits our particular need and not necessarily the need of somebody else in the next county. When the cost of any machine, device, any form of automation — and automation incidentally is best defined as any machine or process that is directed by impersonal means — instead of being directed by a person it is directed by a power device — the cost of any machine must take into account that ours in a highly cyclical business. We're not in the manufacture of stove bolts. They can buy a machine, put it on three shifts a day and in a period of one or two years turn out a simply incredible amount of work. We would have, for example, a machine which does all of our field balling. I wonder how many hours a year we would use it to accomplish the task well and quickly. Therefore I wonder if we can afford truly expensive and complicated machines. In whipping out this true cost of this machine, the operating cost must be taken into account along with the price, and the cost of maintainence, and/or its depricated value after it has been used for the length of time, like a used tractor or earthmoving equipment. It is a little hard for me to think of an analogy in the plant propagation area.

But there are also very good reasons for having machines and it must not be construed that the censensus around the round table was that machines have no value. Obviously, very clearly, we have to continue to search for and look for machines that will do the job better for us. After all it is impossible to put a dollar value on being able, for example, to get all that B + B dug on the first week of the digging season, it would be possible to lean back and solicit further orders. As it is most of the time, I am sure, we are guaging how many plants we must dig, what labor force we can effectively focus, and that isn't just in terms in numbers of people, it's numbers of people that can be adequately supervised, against the time element envolved. Until finally sometime through the middle part of the season we are bound to get that once a year phone call "ship it" or "cancel it." All of us then are seriously looking for a machine that can accomplish the job. It saves us the necessity of facing that issue. I'd like to conclude here quickly — there was no consensus at our table as to how to guage the price of a machine — and say yes, I can afford this or I can not afford it. Looking around for industrial standards I found that there was almost no standard.

Just for the sake of discussion I said that any machine to be worth purchasing must save its price and its cost of operation in terms of labor or personal relations, whatever you want, with in the first season or first year of operation, whichever is less.

MODERATOR JOHNSON: Our second round table discussion was moderated by Bob DeWilde.

## WEED CONTROL IN POTTING SOILS, SEED FLATS, BEDS, AND FRAMES

ROBERT C. DEWILDE, *Moderator*
FREDERICK O. LANPHEAR, *Recorder*

Today each nurseryman realizes the economic importance of developing a weed control program for potting soils, seed flats, beds, fields, and frames. Properly executed control programs will reduce production costs, improve quality, as well as increase the number of saleable plants per acre. We apply the epithet "weed" to those unwanted plants which compete with our ornamental plants for water and nutrition.

Essentially there are three ways of controlling weeds:

(a) Mechanical Control achieved by the use of tools from cultivators, rototillers, flame throwers, and compressed air through the expert use of the hand.

(b) Physical Control through the use of mulches or physical barriers which prevent weed growth.

(c) Selective Chemical weed control through the use of chemicals which kill specific weeds without injury to the ornamental crop.

With regard to physical control of weeds, this was the technique used to obtain three year weed control in container grown stock. A black plastic circular disc of two, or four mil polyethelene was cut with a slit to the middle. The disc is placed on the pot so it fits around the base of the plant and extends to the edge of the pot. A little sand is then placed on the polyethylene disc to hold it in place. Only a scattering of easily pulled weeds may appear around the edge of the container during a three year period. The polyethelene disc does not interfere with watering. In practice the disc will reduce the frequency of watering by 50% in some cases.

Numerous mulches were discussed and a list of some of the types discussed appear below. All the mulches listed seemed to have some drawback, but many are used as they are usually cheap to purchase if locally available, authough expensive to apply, and they will control weeds particularly if used or mixed with a weed control chemical. Mulches may of course provide some additional benefits by preventing soil erosion, aiding moisture retention, and supplementing the nutrient supply.