you apply honey to cuttings. It was diluted in water and used as a soak but we gave it up because of a decay problem.

MR. FRED REAL: What type of propagation materials do you use?

MR. FAZIO: We use semi-hardwood stem cuttings about one quarter of an inch in diameter. Each cutting measured approximately five to six inches in length and contained one to three leaves.

MR. RALPH MOORE: What about wounding? What is the length of eucalyptus cuttings?

MR. FAZIO: Five to six inches in length. Making three cuts through the bark with a razor blade approximately one inch long near the bottom end of the cutting resulted in a higher percentage of roots.

MR. BRUCE BRIGGS: Did you run any tests for the reason for making three wounds rather than just one wound?

MR. FAZIO: No. They were made on three equal sides; possibly one would have been sufficient.

DR. LAMMERTS: Did the shoots from which the cuttings were taken come from the base of the tree right near the soil.

MR. FAZIO: Yes, at the soil line.

VOICE: Did these new shoots from the base that came following wounding have the form of seedlings or mature leaves?

MR. FAZIO: They showed characteristics of mature leaves; there was no evidence of juvenility.

IV. Bedding Plants and Ground Covers

MODERATOR: Mr. Carl H. Zangger

PROPAGATION AND GROWING OF GROUND COVER PLANTS AT PERRY'S PLANTS, INC.

CARL ZANGGER
Perry's Plants, Inc.
La Puente, California

Perry's Plants are primarily growers of bedding and ground cover Plants. We produce several hundred thousand flats of annual and perennial bedding plants as well as over 100 varieties of herbaceous and woody types of plants used for ground cover planting purposes. All of our production of ground cover plants, with a very small exception, is sold by the flat of 64 to 100 plants depending upon the variety. The great majority of these plants are sold at a price varying from .02c to .03c per plant. You can see that it then becomes necessary to produce saleable varieties at an absolute minimum of cost. This price includes not only the rooting and growing of the plant, but must also cover all other costs of doing business, and allow a small profit as well. Simplification and standardization of procedures is an absolute necessity. All varieties are rooted, grow on and

sold in the same flat. We do not transplant rooted cuttings other than to fill in where a plant failed to root.

We use the U. C. system of growing. Except for the soil used for planting seed we have only one soil mixture. This is a mixture of ⅔ fine silt sand and ⅓ Canadian Peat with necessary nutrients added. All of our soil is mixed in a stationary mounted cement mixer that is capable of handling 7 yards of soil at a batch. Soil is mixed and steam sterilized while mixing right in the mixer. After sterilizing the soil is dumped on a conveyor belt and transferred to a flat filling machine from which the soil is dispensed into the individual flats. This machine is timed to fill 16 flats per minute. After the flats are filled they are placed on pallets and taken by a fork lift truck to the particular area in which they are to be planted. We do all of our planting at the bench or house area where the flats of cuttings will be rooted. This enables the person doing the planting to place the flat of cuttings on the bench avoiding the necessity of having another party handle and transport the flats of cuttings to the growing area.

Nearly all of our cutting wood comes from our planting of stock plants for this purpose. We have approximately 4½ acres devoted to this purpose. Cutting wood is brought in from the field to the women making the cuttings. Varieties which can be processed by snapping the wood by hand are processed in this manner for two reasons. One is that there is less possibility of the transfer of disease organisms from the knife or shears. Secondly, cuttings can be made much more quickly. After the cuttings have been made, all cuttings go into tubs of fungicide, containing 2 teaspoons of Morton's Soil Drench and ¼ cup of 75% Terrachlor to 5 gallons of water. Cuttings are thoroughly drenched and then removed and placed into the flats of soil. Again we follow the same procedure on all varieties. One exception is that many varieties of Verbenas seem to be allergic to Terrachlor so therefore we eliminate the Terrachlor from the fungicidal dip and use only the Mortons Soil Drench on this variety. We have three different types of houses that we use in rooting most varieties of ground covers. These are quonset type plastic houses, conventional greenhouses and saran shade houses.

Our quonset type plastic houses are used for the greatest varieties of cuttings. These are houses 24 ft. wide and 96 feet long and 7 feet high at the center. Each house holds 700 flats. All are benched and equipped with mist systems. Our mist nozzles are Nylon Econ O Mist Nozzles placed 3 feet apart on the line. Timers are standard 5 minute interval timers. We have a 6 foot wide cement walk down the center of each house so that we can very quickly remove the rooted flats from the houses by running our electric trucks equipped with special racks for holding flats right through the house; also much of the planting is done on tables placed in this wide isle. We cover the houses with 4 mil polyethylene in November and leave them covered

until April or May at which time we remove the poly and cover the houses with saran shade cloth. Heating is by natural gas unit heaters. We do not at present use any bottom heat although some varieties would root somewhat quicker, particularly during the winter months, if we had bottom heat available. In our area we find that the natural heat from the sun is sufficient to give us all the daytime heat we need except for rare periods of short duration. Most all the heating done is at night.

We do plant most of our Ivy, Iceplant and other succulent types of plants in our saran shade house. Again we follow the same procedure described earlier in making the cuttings, dipping and sticking etc. The main difference is that these flats of cuttings are allowed to sit in the open under the saran to root. In the case of Ivy cuttings we place the flats of cuttings in the beds and then cover the entire bed with sheets of polyethylene, they are left covered until they are rooted. We find it necessary to check under the polyethylene only once a week to be sure plants have not dried out. During cool weather many beds are watered only once or twice during the period they are covered, which is about 30 days. When the beds of Ivy cuttings are rooted we remove the poly covers and leave the flats right in the beds they were originally placed to finish their growing. When they have reached saleable size they are loaded directly from this same bed into the truck that will deliver them.

We, as most growers, have gone through our periods of trial and error. One troublesome occurrence we had some time ago was that in a house of cuttings of the same variety, we would have flats here and there that would appear to be burned, some would be a whole flat, others might be only a few rows of plants in the flat. After a great deal of checking we found that some of the women were not removing all of their cuttings from the fungicidal dip. When they place a batch of cuttings into the dip they would remove most of them and stick them but there were a few that remained in the bottom of the tub. These cuttings that remained in the fungicide too long were the ones that were burning.

Should fungus disease occur in flats of cuttings we have found that drenching the flats with a solution of Terrachlor and Morton Soil Drench has been reasonably successful in stopping it. We have also used Shell 345 with a fair degree of success.

At the present time we are experimenting with mist containing nutrients. Some advantage seems to be possible on varieties such as Verbenas and Chrysanthemums in that plants retain a better color and become saleable quicker. We have not noticed any appreciable speed up in rooting however.