Our present system is as follows: Bark is transported from the mill to Adelaide in 78 cu.yd. loads. It is hammer milled and screened into four sizes for use in landscaping and nursery potting media. To make the media, the fine screenings are spread on the ground and sand or loam is added according to the specific requirements of the client. This is mixed by a series of picking up and dropping with the front end loader. This mix is returned to the vibrating screener and the required amount of premixed fertilizer is added to the top and vibrated down through the mix. To reduce the dust problem and improve handling of the mix, water can be added to the bark. With this system we can handle 40 to 50 cu.yds per hour. (During this talk an 8 mm film was shown explaining the processing of bark and soil mixing as it is done today.)

COMMERCIAL APPLICATION OF TISSUE CULTURE IN ORCHID NURSERIES

SYD MONKHOUSE

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Since 1960 tissue culture has revolutionized the orchid industry, both in making top show cultivars available in great quantity and also in revolutionizing the cut flower section of this industry. French tissueculturist, Prof. Georges Morel, together with the orchid firm of Vacherot and Lecoufle, realized the commercial prospects in this field and quickly established the first orchid tissue culture commercial laboratory in the world from which they produced plant divisions by meristematic tissue culture and offered them for sale. The word, "mericlone", was coined to describe plants propagated by this method. This has been a most successful venture for this French firm and naturally most other orchid propagating nurseries in the world have followed suit.

Further advances in tissue culture technique have enabled the production of virus-free plants from infected stock; however, this expensive process has been limited to very few cultivars. With tissue culture for virus eradication in orchids, there is also a very large degree of luck, as the procedure is by no means foolproof.

Of late, the treatment of orchid tissue with chemicals such as colchicine has allowed ploidy doubling in many clones and this is proving an advantage to orchid growers, especially the hybridists. It is now possible to convert very desirable diploid parent stock to tetraploid stock by this process. The actual me-

chanics of meristem tissue culture of orchids varies a little from genus to genus and is not easy to describe. Briefly, the procedure is as follows in the case of the orchid genus *Cymbidium:*

1. Select a half-formed new shoot growth from a plant.
2. Strip off the outer leaves, thus exposing the growth "eyes" at the base of each leaf.
3. Sterilize in any well known sterilizing agent and transfer to a sterile, laminer flow unit.
4. Under low powered microscope the actual growth meristem is excised from each little growth-eye and this tissue is placed in a tube of sterile growth medium. Approximately six such meristems can be obtained from an average cymbidium growth.
5. After three weeks the meristems will have commenced to grow and they are returned to the sterile planting cabinet.
6. The "protocorms" are cut into three or four pieces each and placed in a tube of liquid medium which is placed on a rotating frame, or a vibrating platform.
7. Because of agitation and vibration, the protocorm pieces are restricted from forming leaves and roots but develop into large clumps of tissue.
8. The dividing process is repeated each three to four weeks until the required number of propagations is reached, at which time the pieces of tissue are transferred to a solid medium and allowed to differentiate and grow on to a complete plant in the usual manner.

During any of the preceding processes it is very simple to transfer the tissue to a liquid solution containing colchicine and a three week stay in such a solution guarantees that a fair percentage of protocorms will have their ploidy doubled. This procedure, which is somewhat costly as a number of protocorms will be killed in the process. is warranted in the case of certain diploid cultivars.

The determination of ploidy change is a rather difficult but interesting procedure. Of course, the only certain method is the microscopic observation of actual chromosome content in the cells. This, however, is a very time consuming and costly procedure as preparation of slides and necessary repetition is almost prohibitive.

The measurement of stomata guard cells of the leaves, especially in comparison with guard cell size of the unconverted plant, gives a fairly positive indication of a change. Careful techniques, with the further meristematic propagations gives a reasonably accurate production of converted clones.