

MODERATOR LAGERSTEDT: Thank you, Dr. Hartmann. We will now hear from Dr. George Oki, Oki Nursery Co., located at Perkins, near Sacramento, California. Mr. Oki --

Growth Regulators, The U. C. System, and the Oki Nursery

George Oki

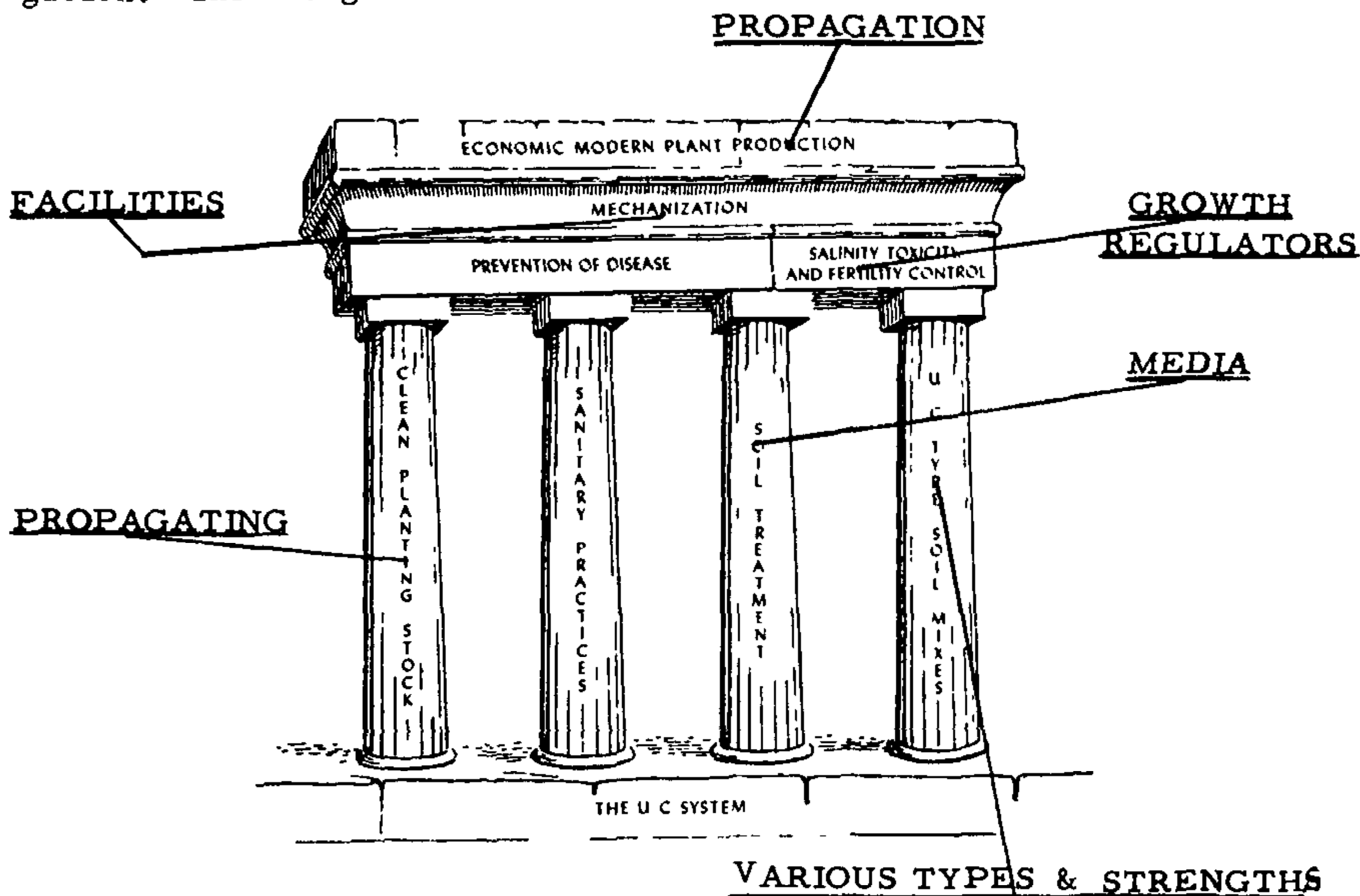
Oki Nursery Company

Perkins, Sacramento County, California

A great deal of emphasis has been placed on rooting hormones since 1935. This, however, did not mark the beginning of the use of hormones. It has been said that Dutch propagators inserted a wheat grain into the split basal ends of cuttings over a century ago.

The wheat grain in germinating, releases an auxin, thus stimulating root growth. Auxin is another term for natural hormone produced by plants. Growth regulators as we know them today are synthetic auxins, with a purpose in mind, "to stimulate root growth".

Although auxins, or hormones, play a very important role in propagation today, there are many other factors equally, if not more important. In the preface of the University of California Manual 23, edited by Dr. Ken Baker, is a symbol of the U. C. System. Within this symbol, with a few minor changes, lies the identical basic rules of plant propagation. The changes are:



The furious pace of today's competitive business world focuses our attention on the economics of plant propagation. The use of growth regulators is primarily an economic factor; thus any supporting facilities that may be built or devised to expedite this operation will directly influence our cost of production.

In the quest of this goal, Oki Nursery has installed in the past four years, in chronological order, greenhouses, heating facilities, mist and, in 1960, a propagation building complete with refrigeration facilities. Primary emphasis was placed on sanitary control and the ease of sanitation maintenance during its entire construction program.

In support of a preventative sanitation program a mother block was established in 1960. All prostrate Junipers and other prostrate type plants were trained and staked to grow upright as standards. The soil being one of the prime sources of pathogens, this area is being turfed since irrigation is of the overhead sprinkler type.

If natural auxins are better produced in vigorous growing plants, then cuttings made from this type stock will root more easily and more quickly with the aid of growth regulators. Heeding this rule of thumb, a great deal of emphasis has been placed on roguing, replacing, and general maintenance in the production of a vigorous growing "mother block".

Sanitary practices in the propagation department is not an impossibility. Ordinary household cleanliness and practices are expected throughout the entire department. Analagous to a housewife washing pots and pans and her kitchen, a propagator cleanses and sterilizes his media and general working tools. (For further information on this subject see page 22 of University of California Manual 23.)

The cutting material brought in is washed thoroughly on portable steel racks. After the cuttings are made, the cuttings are dipped in a solution of Morton's Soil Drench C. (1 oz. per 35 gallons of water). The cuttings are drip-dried and the basal ends are treated with hormones. Both the powder form and the quick-dip method have been used. Thus far our records are inconclusive in making a definite statement as to which is preferable, but indolebutyric acid in the liquid form is much more flexible and easier to use in formulating different concentrations.

To obtain a 1000 part per million IBA solution dissolve 1 gm of IBA crystals in 500 cc's of Quakersol (95% ethyl alcohol). Stir vigorously to assure solvency and then add 500 cc of water and shake again. If stronger solutions are required just dissolve more IBA crystals, keeping in mind that each gram of IBA increases the strength of the solution by 1000 ppm.

Since our entire program is based on soft-wood cuttings, the usual IBA strength is 1, 3 or 5 thousand ppm. Keeping in mind that the greatest cost involved is the actual gathering and preparation of the cuttings we use a lesser concentrate than may be recommended. An extra week into

the greenhouses becomes incidental if the loss should become greater due to hormone burn.

These hormone-treated cuttings are then stuck into a steam sterilized perlite media. It may be interesting to note that we use a flat of perlite 3 to 4 times before dumping. Sterilizing each cycle and reuse does not seem to affect the rooting percentages or quality. As a general rule, most soft-wood leafy cuttings are ready for the hardening-off house in 3 to 4 weeks, more or less. This ends the initial phase of production.

To summarize then, although growth regulators or hormones are very important, we now see the contribution of each segment of the U. C. symbol and we should never lose sight of the gift of natural auxin that nature has provided us. Facilities and its limits are endless. Prevention of disease by clean propagating stock, common sense sanitary practices, and sterilized media are vitally important. How useless a growth regulator can be rendered is often seen in a pathogen-infested crop failure. Here, then, is the true and actual beginning of the U. C. System.

MODERATOR LAGERSTEDT: We will now have questions from the audience. The first two questions are to Mr. Oki. What strength do you generally use in your nursery to strike roots on cuttings and what sequence do you use in your intermittent mist?

MR. OKI: 5000 parts per million, as an alcohol-water quick-dip solution. The sequence used for our mist varies with the season, but specifically in the summer when soft-wood cuttings are taken, the sequence is 10 to 15 seconds of mist every 5 minutes.

MODERATOR LAGERSTEDT: Some questions for Dr. Hartmann - where can concentrated IBA be obtained on the West Coast and what commercial preparations are available?

DR. HARTMANN: Braun-Knecht-Heimann at 1400 16th Street, San Francisco 19, California, handles pure IBA crystals. Hormodin powder, in three strengths, contains indolebutyric acid as the active ingredient and is sold by many garden supply companies. It is manufactured by Merck Chemical Co.

MODERATOR LAGERSTEDT: One further question for Dr. Hartmann. In rooting cuttings of the Old Home pear rootstock, why do you hold them at 70°F for 3 weeks before planting?

DR. HARTMANN: Treatment with IBA stimulates development of root initials but only if temperatures are high enough to permit cell activity. If the cuttings are inserted into the cold soil at - say 50° - after treatment, nothing happens. Holding the cuttings at 70° after treatment gets root initials actually started. Planting in the cold soil then may temporarily retard further development, but as soon as the soil becomes warm in the spring the already-formed root initials begin growing - right along with the opening buds above ground.

MODERATOR LAGERSTEDT: Now some questions for Dr. van Overbeek. Are there any commercial brands of kinins available?

DR. VAN OVERBEEK: As far as I know all materials are experimental. One is Shell Verdant<sup>R</sup> Senescence Inhibitor. It is also still experimental.

MODERATOR LAGERSTEDT: Will kinins stimulate shoot development on root cuttings?

DR. VAN OVERBEEK: Kinins are known to stimulate bud development, so it is logical that they can stimulate the buds on root cuttings.

MODERATOR LAGERSTEDT: Another question from someone in the audience. We ship broad-leaved evergreen plants bare root to the East and defoliation is a problem. Do you think a kinin dip would be helpful to retain leaves?

DR. VAN OVERBEEK: Kinins maintain green foliage in healthier, greener condition so one might expect less deterioration. Perhaps a mixture with a small amount of auxin should be tried, as the latter does retard abscission.

MODERATOR LAGERSTEDT: Would kinins sprayed on cuttings aid in root initiation?

DR. VAN OVERBEEK: They retard it, except perhaps in very low dosages. I may point out here again that this is the first time that the subject of kinins has been brought up in connection with possible uses in the plant propagation business. It is a broad field, full of opportunities for those willing to experiment.

MODERATOR LAGERSTEDT: Does kinin have any fungistatic action which may make leafy tissue resistant to fungus invasions?

DR. VAN OVERBEEK: Not directly - it is not a fungicide. However, due to its effect on the maintenance of leaves, kinins decidedly prevent fungi from attacking the leaves. It is a question of a healthier leaf being more capable of beating off an attack.

MODERATOR LAGERSTEDT: This concludes our questions as well as the program for this evening. I wish to thank our speakers for participating in the program tonight.

#### THURSDAY MORNING SESSION

October 26, 1961

The session convened at 8:45 a.m. with Mr. Jack Spring, Chief Nurseryman, Golden Gate Park, San Francisco, presiding. The subject of this Symposium was Selection of Vegetative Propagative Materials.