THURSDAY EVENING SESSION

October 13, 1966

VICE-PRESIDENT ISHIDA: Our panel this evening will discuss "The Anatomy of the Plastic House" and the moderator will be Robert Boddy. Bob —

MODERATOR BODDY: Thank you, Henry. We have assembled a panel of experts this evening to speak on the subject of plastics and the anatomy of plastic greenhouses as pertains to our profession. The plastic structure is basic to our industry. All of us have something to do or have had something to do with plastic houses. It is almost as basic today as the propagatgating knife. I don't know what people did 10 or 15 years ago when there was no plastic. Now we just assume that it is available. Furthermore, this is a subject which is not like meristem culture, or some of those more complicated subjects that were presented just before dinner — here is a subject that you can all handle with a pair of scissors, a hammer, and a saw. I would like to introduce our speakers quickly, one by one. We have George Oki of the Oki Nursery in Sacramento ; Jim Perry of Perry's Plants in La Puente; Joe Klupenger from Oregon — Klupenger's Greenhouses; Ken Inose of Gardena; Al Holland — from the Agriculture Extension Service in Orange County; and Tokuji Furuta, Extension Specialist, University of California, Riverside. Our subjects will cover the construction of a house, how you cover it, the use of plastics in different operations, such as Joe's — which is basically a pot plant business, and Jim Perry's — which is basically a bedding plant business. The first speaker on our panel this evening will be Mr. George Oki, recent President of the California Association of Nurserymen. George —

ANATOMY OF A GREENHOUSE

GEORGE S. OKI
Oki Nursery, Inc.
Sacramento, California

Webster's Collegiate Dictionary still defines a "greenhouse" as; "a glassed enclosure used for the cultivation or protection of tender plants." In the last decade, a greenhouse has taken on the sophisticated title as an "enclosure for environmental control."

While it is true in days past that heat was the primary element added to protect and cultivate tender plants in greenhouses, very little was done toward cooling. The only control for high temperature was accomplished by ridge and side ventilators.

With the advent of "pad and fan" cooling the entire concept of greenhouses was altered. Continuous ridge and furrow type houses became a standard. With temperature and hu-

midity control, crops could now be cycled with pinpoint accurcy with maturity dates as prime objectives.

In the past several years, cycled lighting and black cloth have made many technological advancements for the horticultural industry especially in blooming crops. Controlled photoperiods has sophisticated many crops and is gradually making its usefulness known to other segments of the industry.

CO_2 in greenhouses has changed the quality of many crops, especially in the flower industry and some greenhouse vegetable crops. Only a few CO_2 generators have been installed in nurseries and most of these are in the bedding plant industry.

With the improvements of greenhouses in the past few years: heat, air in movement. humidity, cooling, controlled photoperiods, addition of advantageous gases, we can now truly say that a greenhouse is an enclosure for controlled environments.

In 1938, the British extruded the first polyethylene sheet film. However, it was not until the early 1950's that this material was used in the nursery-floriculture industry and it has made a very sizeable impact in production techniques.

Since the advent of polyetheylene, we have seen a host of other materials used. PVC, Mylar, and fiberglass are but some of these plastic films or panels used today. Each material with its inherent qualities must be wisely used to obtain the optimum useful purpose to glaze or cover the "greenhouse" structure.

Plastic greenhouses have two distinct advantages. One is the economy of temporary structures for high seasonal use. The second is that many growers have built these structures during off-season periods with many materials already at hand.

One of the major problems with plastic structures is inadequate frame work construction. This has resulted in many crop failures due to the rupture of the plastic sheets. It has also raised the annual cost per square foot, calculating investment, depreciation period, and maintenance.

By its very nature of being temporary, heating and ventilation have been poorly provided and this has resulted in many crop failures. One must definitely keep in mind that to grow a decent crop of greenhouse quality — heating, ventilation and cooling must be properly and adequately supplied. Therefore, the cost should be nearly identical per square foot for adequate heating and cooling, whether it be a glass or plastic house.

The cost of the various types of greenhouses, whether glazed with glass or plastic, vary widely by areas. Building codes and weather also govern many costs. The degree of "sophistication" will also govern and influence the cost of many structures.

A recent study shows that plastic type houses may cost from 2.5 to 75c per square foot or from 10,000 to 30,000 dol-

lars per acre. Glass greenhouses vary in cost from $1.00 to $3.00 per square foot or $40,000 to $120,000 per acre. Calculated cost per year per square foot, oddly enough, is very close for both types. These costs include interest on investment, taxes, maintenance, and depreciation, and are calculated on an acre size unit; averages are — for glass, 15c to 26c per square foot per year, and 11c to 19c per square foot per year for plastics.

The market today demands quality products, and profit and quality are keys to all successful business operations. Physical facilities must be well-planned, heated, ventilated and highly mechanized and automated; tempered with the rapid urbanization of the nursery neighborhood, the key to your choice, the type of greenhouse structure you should build.

MODERATOR BODDY: Thank you very much George. Our next speaker is Jim Perry, who will discuss his use of plastics in the production of bedding plants. Jim was voted the outstanding nurseryman of the year at the recent California State Nurserymen's Convention, receiving the Pacific Coast Nurseryman Award. Jim:

ANATOMY OF THE PLASTIC HOUSE

JAMES C. PERRY
Perry's Plants, Inc.
La Puente, California

The use of plastics has greatly increased during the past few years and, until something better comes along, I feel that plastics will be used for many years as coverings for preservation of heat and for climate control in the growing of plants.

Perry's Plants has benefited greatly by the use of plastics in our growing procedures. We are currently using polyethylene sheeting, 4 mil, for winter covers and protection, as well as the corrugated PVC (polyvinylchloride) for a permanent structure.

The polyethylene sheeting is used for covering, during the winter, our temporary structures, which are made of bent ½" pipe, giving the shape of the quonset hut, with a curved dome top. We have taken a standard 21-foot length of galvanized pipe and with the use of a homemade jig, bent the pipe to conform to the shape that we desire. There is a three-foot straight leg on each end and the rest of the pipe between these three-foot legs is curved into a half-circle. The reason for the straight legs is to give us a perpendicular wall to accommodate the benching and growing close to the outside edge; the curve then swings over the top. Our houses are constructed with about 6'6" clearance in the center. This gives us a floor space 16 feet wide. The bow is then fastened on the inside of a 1' x 12' (a 2' x 12' could be used) that stands on edge as an outside wall. Pipe clamps are used to secure and hold this bow in an upright po-