

# PINE TREE PROJECT

Research in progress in Caltech's Earhart Laboratory marks the beginning of a new era in scientific forestry

A SMALL PINE CONE, mounted in lucite, was sent off from Caltech this month to Dr. George Jemison, of the Branch of Research of the U.S. Forest Service in Washington, D.C. It was a pretty special pine cone. It marked the beginning of a new era in scientific forestry, because it had been produced in Caltech's Earhart Plant Research Laboratory.

The pine cone was the result of a project set up two years ago by Dr. Jemison, in which Caltech and the U.S. Forest Service have been jointly studying "important and difficult problems of forestry." One of the most difficult of these problems has been to find a way to produce early flowering in pine trees.

The reproductive cycle of the pine tree is so long that geneticists are not ordinarily able to study it. The breeding cycle of the Western yellow pine, for example, is like that of a human being; it takes 30 years from

seed to tree to pine cone to seed again. This means that, if a 30-year-old forester crosses a pine tree, by the time he finally obtains the seeds produced by his hybrid tree, he will be just about old enough to retire from work.

When the Caltech and U.S. Forest Service researchers started their pine tree project, they chose a Southern pine to work with. This variety not only flowers much earlier than the Western yellow pine, but it is of great commercial interest besides. In fact, the Southern pine is the most important pulp wood in the United States today, and it is now even grown as a crop, like cotton.

The researchers started with selected seeds from single trees of the Southern pine. The seeds were planted in the Earhart Plant Research Laboratory at Caltech, where climatic conditions can be controlled. Some of the small trees were placed under conditions of continuous summer, so that they grew rapidly in size. Some were planted under conditions of alternate summer and winter, so that several yearly growth cycles were consummated in each 12-month period. Finally, some of the trees were first grown to large size in continuous summer, then given a long winter period of dormancy before being returned to summer conditions—in which they resumed their growth.

Two years after the seeds were planted, this third group of trees produced three female flowers, or pine cones. This is believed to be the first deliberate induction of flowering in a pine tree.

The fact that cones have been produced in the Southern pine in two years—instead of the usual 10 to 15 years—means that it may now be possible to hybridize through repeated generations in the time-span of a single human generation. In other words, it may soon become practical to breed trees for faster growth, for better wood, for resistance to disease and pests, or for growth in varied climates.

The research is being carried on by Dr. Henry Hellmers—a scientist of the U.S. Forest Service assigned to Caltech, where he is a senior research fellow in biology—and Dr. James Bonner, Caltech professor of biology.



The first pine cone to be produced under controlled conditions in the Earhart Plant Research Laboratory.