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## California agriculture and genetic engineering

Development and selection of improved species, varieties, and races of plants and animals are the cornerstone of modern-day agriculture. Geneticists and plant breeders throughout the world have interacted with plant and animal scientists, entomologists, pathologists, nematologists, and physiologists to give us tomatoes resistant to wilt, wheat resistant to rust, hybrid corn, large-breasted turkeys, long-fiber cotton, high-producing strawberries, and a host of grape varieties that give us an almost unlimited selection of fine wines. Such a process has been going on for hundreds of years, perhaps thousands.

Why then is it suddenly pertinent to devote an entire issue of *California Agriculture* to one of the world's oldest sciences, genetics? There are several reasons. The first is to celebrate a new era in this old subject. It is a truism that great developments in science await new discoveries. Although genetics and the interaction of other sciences have brought us many improvements in animal and crop production, many have escaped us. Hence, the development of a new tool, which we have come to know as genetic engineering, provides us in the scientific and agricultural community with an opportunity for celebration.

It is interesting to note that, even though we often decry the fact that the world has little desire to understand and even less desire to support our scientific endeavor, a new breakthrough such as we have recently seen in this area has attracted attention in the panelled halls of the largest companies of the world. Even Wall Street uses words like "cloning," "DNA," "monoclonic antibodies" in the same breath in which they talk about a "bullish market." Certainly, all this enthusiasm justifies celebration.

But more important, it is a time for reexamination and renewal. We have had great debates over the last 25 to 30 years about the values of basic research versus applied research. We have had great debates about defining the different categories of research. Whole universities have been reorganized to separate basic from applied research. Indeed, some have even suggested that only federal agencies should do basic research, and that state universities should do only applied research.

This new development in genetics is a clear demonstration that creative research must go on in every direction that human beings can press their imaginations. The structure of DNA, purification of proteins, the functions of bacteriophage, hybridizing of a protoplast, culturing of cells, cloning of tissues, development of cultural technique, and merchandising of new products are equally essential in the chain of events that lead to the development of a new organism. This is indeed an opportunity for celebration, for we have again seen that integration of the dreams and experiments of biologists, physicists, chemists, agronomists, pathologists, and all the other "ologists" has been an essential part of this new and exciting concept. Let us toast this latest breakthrough in science with the commitment to maintain an integration of all aspects of scientific endeavor to ensure a productive agriculture and clean environment for a healthy world.