

## "New biology" gives new-tools to agriculture

ITHACA, NY — America's unmatched agricultural technology, which has made the United States the breadbasket of the world, now has new powerful tools — modern genetic techniques — to achieve even greater strides in the years ahead, according to a panel of the nation's leading agricultural scientists.

Dramatic advances made in the so-called "new biology," known more broadly as biotechnology, offer scientists a "fresh starting point" for progress toward potentially great rewards, the

panel says.

"What scientists will now be able to accomplish through the use of modern molecular genetic techniques is awesome," the group points out. "To be slow in acknowledging and employing the power of these new tools would be to delay the progress of American agriculture."

The 18-member panel, led by a Cornell University scientist, made the point in a comprehensive report issued this month. The 120-page report is based on a year-long study conducted by a select

committee created by the Board of Agriculture of the National Research Council (NCR)

Ralph W. F. Hardy, a visiting professor of life sciences in the New York State College of Agriculture and Life Sciences at Cornell, served as chairman of the Board of Agriculture's Committee on Biosciences Research in Agriculture, which prepared the report — "New Directions of Biosciences Research in Agriculture: High-Reward Opportunities."

Two other Cornell scientists

were members of the panel — Milton Zaitlin, associate director of the Cornell Biotechnology Laboratory, professor of plant pathology, and Donald Bauman, professor of nutritional biochemistry.

The committee, says Hardy, represented a breadth of knowledge across the disciplines of science as well as a combination of experience in research, management, and administration in both academe and industry.

The study was conducted for the Agricultural Research Service, the research arm of the U.S. Department of Agriculture, to identify and recommend areas of research in "bioregulation" to be pursued to "ensure the highest dividends to agriculture."

"The basic research approaches and goals outlined in this study can apply to the agricultural research community at all levels," says Hardy, who is also president of a Boston-based biotechnology firm known as BioTechnica International.

Pointing to the great potential of molecular genetic and recombinant DNA techniques, or gene splicing, the NRC report suggests how these scientific tools might be used, along with other methods, to yield new insights into studies of food animals, crop plants, and disease organisms and insect pests attacking food plants and animals.

The development of genetic theory, the growing understanding of the DNA molecule, and the expanding capabilities in cell and tissue culture now enable scientists to manipulate the gene — the basic blueprint of life — to boost the efficiency and productivity of American agriculture, the report says.

"Modern genetic technology, including recombinant DNA and the ability to isolate, transfer, and express foreign genes in crop plants and food animals, will likely have a major impact on agriculture comparable to that of the discovery of the laws of inheritance in the late 1800s," the report points out.

What scientists have come to understand about plants and animals over the past several decades is impressive. The result is an overall increase in agricultural productivity of 240 percent in the past 50 years.

This increase is characterized by dairy cows that have more than doubled milk production per cow since 1950 and by dramatic improvements in grain yields.

Armed with the rapidly advancing techniques of the new biology, scientists now possess the ability to visualize the gene — to isolate, reproduce, and study its structure and its relations to the processes of living things, the report notes.

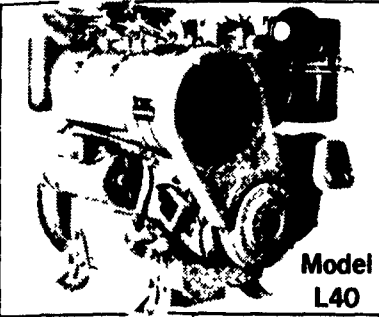
"The molecular genetic and recombinant DNA techniques are opportunities to be seized," the report stresses. "They are tools, not an end in themselves. They can be employed to discover additional basic information about genes and the protein products that trigger a response to disease, regulate growth and development, or govern communication between cells and between organs."

Stressing the need to step up basic research to develop further the molecular genetic and recombinant DNA techniques, the report cites some of the major areas of research aimed at boosting the agricultural ef-

(Turn to Page D38)

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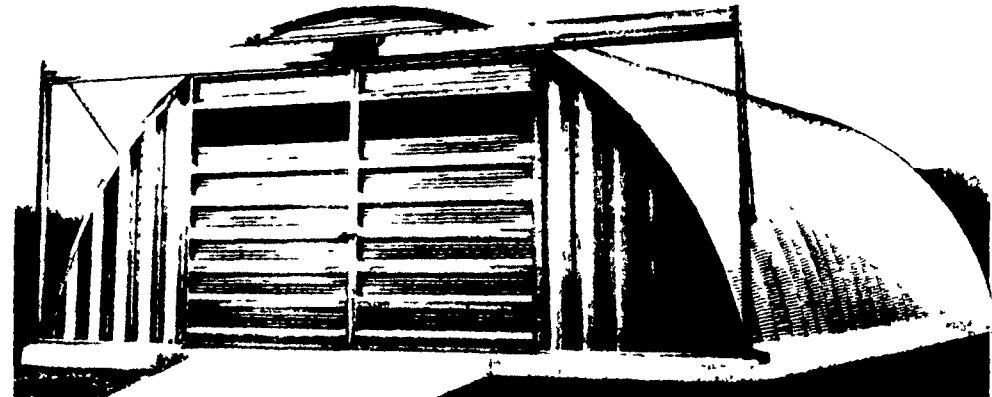
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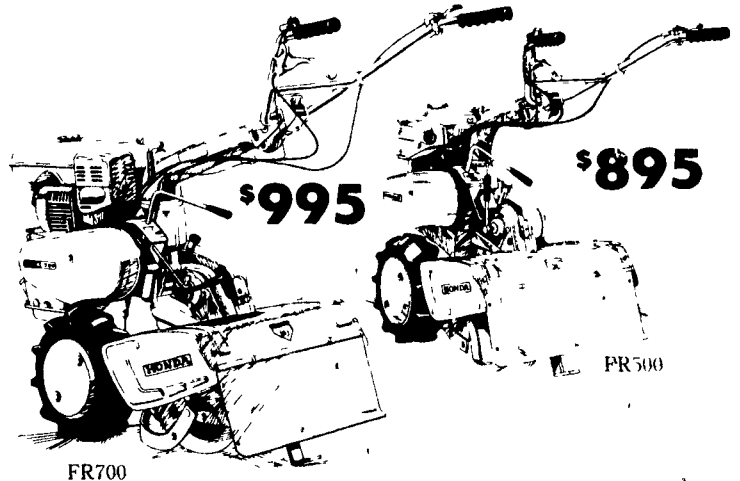
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