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Opportunities in Plant Science

A major determinant of the quality of future civilization will be the wisdom and effectiveness with which man deals with renewable resources and with the natural environment. Central to good management of these matters is first-class competence in the plant sciences. Recently there has been much talk about ecology and the environment, but there has been no corresponding acceleration in the undergirding fundamental science.

At one time botany and zoology were roughly coequal in biology at universities. The emergence of large federal support for medically oriented research changed that relationship. Some aspects of botany, such as growth, were supported moderately by the National Institutes of Health, as was photobiology, including photosynthesis. Other aspects, such as ecology, were not encouraged. Thus, botany came to be overshadowed in some universities and lost identity and stature.

The financial strains of the past few years have been felt rather keenly by plant biologists. The NIH and the Atomic Energy Commission have found it necessary to diminish their support. The National Science Foundation has begun to increase its funding for botany, but the level is still quite low.

Botanists are almost unanimous in their disappointment that the Agricultural Research Service (ARS) has not chosen to institute a grant system comparable to that of NIH. Although academic botanists concede that agricultural research has been cost effective, they feel that ARS has not given sufficient support to work of a truly fundamental nature.

Given an improved intellectual climate and a moderate increase in funds, the plant sciences would flourish. There are substantial matters, both applied and fundamental, to address. The practical challenges facing plant biology include applications in temperate and tropical agriculture and in management of fields and forests. We have developed extraordinarily productive farm crops, but monoculture and the use of limited strains of plants makes the food supply vulnerable to plant enemies such as the southern corn leaf blight. Most of our agricultural research has been devoted to plants of the temperate zone, and the knowledge acquired is not readily adaptable to tropical conditions. Success to date of the "green revolution" indicates what might be accomplished.

A superb group of tools and techniques developed for use in animal biochemistry can be employed effectively in the study of plants. As one example, the use of amino acid analyzers has been crucial in the selection of maize mutants possessing a high lysine content and correspondingly high nutritive value. Recently, it has become clear that plants are involved in complex chemical warfare with pests and with each other (*Science*, 26 February 1971). Greater knowledge of the biochemistry of plants will add an important new dimension to comprehension of ecological relationships. The use of atomic absorption equipment can enlighten us on requirements and utilization of limiting trace elements. One of the developments that seems particularly useful is the creation of mobile laboratories, which enable investigators to study the behavior of plants under a wide range of natural conditions. Thus, the performance of a twig or leaf can be measured under controlled conditions while still attached to a plant.

Research opportunities in many aspects of botany await the energetic and imaginative investigator. Modest increases in support for fundamental research in the plant sciences would bring beneficial returns of disproportionately large magnitude.—PHILIP H. ABELSON