Agricultural Research under Fire

The long-neglected realm of agricultural research has been receiving attention from the outside world in recent months, but not all of it has been favorable. One eminent group of critics has castigated the research establishment for being inert and resistant to change, another for its isolation from the mainstream of academic science.

A report on U.S. farm policy* issued last month by the Committee on Economic Development, a New York–based research group, holds agricultural research institutions to blame for "signs of age and a lack of imagination" in dealing with critical problems. "Administrators of agricultural research institutions have often become identified with maintenance of the status quo at the expense of innovation," the committee says. Its report goes on to note a lack of evident breakthroughs in areas such as soybean research and production efficiency in the cattle industry.

The sources of these criticisms are not wild-eyed radicals. They include the chief executive officers of Ralston Purina, the Del Monte Corporation, Universal Foods, H. J. Heinz, and Deere and Company. The chief author of the report's section on research is John A. Schnittker, an agricultural economist who was Undersecretary of the Department of Agriculture (USDA) during the Johnson Administration.

The agricultural research establishment has tried several times in the past to reform itself, Schnittker said in an interview, but these have all been self-reviews which were not terribly successful. Part of the fault lies in the inflexible nature of the congressional appropriations process, which leads to research stations being sited in congressmen's favorite states. Congress also allows itself to be used as an instrument to repress researchers, Schnittker believes. "The research community by and large is afraid to raise its head on questions of chemical pollutants, of the environmental fall-out from agricultural practices. This is because the big companies will go to Congress, and the researcher who is too independent will get his money cut off," he says. Schnittker has not kept in close touch with USDA affairs since he left in 1969, but considers the basic situation to be unchanged.

Asked about the committee's comments the administrator of the Agricultural Research Service, Talcott W. Edminster, said that continuing cuts in budget and staff are the cause of any semblance of status quo. The present purchasing power of the ARS budget is about the same as in 1964, while the staff has been cut from 10,000 in 1969 to 8,000. With these dwindling resources the ARS has had to mount a host of new programs in environmental matters and food safety. "I think our flexibility has been almost amazing," Edminster says.

A more philosophical critique of the agricultural research establishment is presented in the summer issue of *Daedalus* by Harvard nutritionist Jean Mayer and by André Mayer, a historian of science at the University of California, Berkeley. Their central theme is that intellectually and institutionally, agriculture has been and remains an island, "a vast, wealthy, powerful island, an island empire if you will, but . . . separated from the mainstream of American scientific thought." For lack of effective outside criticism, the Mayers say, "a great deal of agricultural research has proceeded on assumptions which are very much open to question." For example, genetic research on crops and animals has been pursued without reference to nutritional values. In both Congress and the USDA, agricultural policy is conducted as a closed shop, immune from outside criticism. There is a serious lack, the Mayers believe, of "scientific critics from outside looking at agriculture in an informed and constructive way."

Outside criticism and advice is a commodity the agricultural research community is likely to receive in increasing surplus as others take interest in its problems. But, as Edminster remarks, "At least it means that agriculture is no longer being taken for granted."—N.W.

* *A New U.S. Farm Policy for Changing World Food Needs.*

chloride, for example, has been found to cause cancers in mice, hamsters, and rats, but it is not known whether it will do the same in people.

► Another unsolved problem of cancer research is whether there is a threshold concentration below which a carcinogen has no effect. The chemicals found in water are generally present in very low concentrations.

► A further complication in assessing carcinogenicity arises when mixtures of chemicals are involved. Chemicals in mixtures may interact with one another to enhance or diminish their capacity to cause cancer. Carcinogens in water could also interact with those from other environmental and occupational sources.

Despite these uncertainties, however, most investigators, when confronted with strong evidence of a chemical's carcinogenicity in animals and no unequivocal demonstration of a threshold—and there has been none at this time—would prefer to minimize or eliminate human exposure.

Many of the 66 compounds present on the EPA list have not been assayed for their carcinogenicity. Some, according to scientists at NCI, are not particularly suspect because they belong to classes of compounds found not to be carcinogenic; others are more troublesome. Herman Kraybill, Scientific Coordinator for Environmental Carcinogenesis at NCI, is assisting EPA in its assessment of the hazards of the chemicals. He is especially interested in determining the carcinogenic effects of mixtures of chemicals. Kraybill said that concern about potential problems with drinking water has been growing for the last 20 months. He himself is less concerned about the effects of chlorination than about chemical contamination from sources such as oil spills and industry.

Cancer causes may also be identified by epidemiological studies. Marvin Schneiderman, Associate Director for Field Studies and Statistics at NCI, said that the statistical approach used in the EDF study was a useful first step in identifying possible causes of disease. But he suggested that the next step should be a retrospective case control study. In this type of study, the case histories of individuals who have died of the cancers implicated by EDF—mainly cancers of the urinary tract and the gastrointestinal system—would be compared with the case histories of patients who have died of other causes. The idea is to rule out