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Agricultural Research

Agricultural science has recently been featured in the News and Comment section of *Science*. This attention to corn, cows, and manure has perhaps been inspired by our dependence on the agriculture that enables us to eat better and to export more. The attention may also have been stimulated by a new style in studies by panels. The Secretary of Agriculture asked for an examination of agricultural research, and the Pound committee gave him a critical audit rather than a hackneyed pointing with pride and viewing (the budget) with alarm.

The News and Comment articles illuminated a paradox that the Pound committee found in scientific policy: some—even a lot—of agricultural science was ranked low by academic standards, but it nevertheless undergirds an efficient scientific agriculture. An additional paradox appears in the News and Comment pieces themselves. At one point it is stated that agricultural research is controlled by administrators rather than by peers in the laboratories, while at another it is said that the "central nervous system has only vestigial control."

A clue to resolving these paradoxes lies in the statement, "The agricultural research system is finely attuned to the immediate needs of its clients." The fine tuning is evident in the response of the system to the attack of corn blight in 1970. Within a year the blight was controlled, and corn and meat were saved. The credit is shared by farmers, seedsmen, and scientists. Confining myself to science, I have measured the response in terms of published research on the blight. In the 2 years before the epidemic, there were only six publications on the subject; in the year of the blight, there were 18; and in the 2 years since there have been 91 publications. In the short time since the epidemic, 62 percent of these reports have come from experiment stations using their own resources, and 22 percent more have come from the U.S. Department of Agriculture alone or with the experiment stations. Clearly the response of agricultural researchers to a problem of their clients and nation was effective. Not all systems are so well tuned. The Federal Council for Science and Technology lamented that in the mid-1960's, when state and local governments needed scientific help to solve problems from pollution to riots, they lacked scientific capability and that "such R & D capacity as developed within their borders was characterized by extra-territoriality of funding." The council also said, "It is instructive to look at one example of a federal . . . program in a specific field that has a proven record of achievement, state and local involvement, and political durability; the Agriculture Department's Extension Service, Cooperative State Research Service, and land-grant university system. . . . The functions of identifying problems, planning research and development, evaluating new knowledge, and disseminating and applying it in the field are well integrated."

This system is not organized in the way that, for example, a factory in the early Industrial Revolution was; messages are not required to pass only up and down vertical channels. Instead, it is a functional system, as factories are today; when the lights go out, the janitor can screw in a fuse instead of calling the front office. It is likely that the tuning of the agricultural research system to its clients' needs makes it highly effective despite some shortcomings, and it is an instructive example for other scientific policy-makers. How fortunate for our dinners that the separate experiment stations are attuned to the needs of the citizen clients rather than those of the central planners. The planners in the District of Columbia grow little corn, while the clients grow a lot.

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