Change Breeds Change at the ARS

To compete in the 1990s, the Agricultural Research Service may have to narrow its research spectrum, jettison marginally productive work, and close some of its 122 field stations

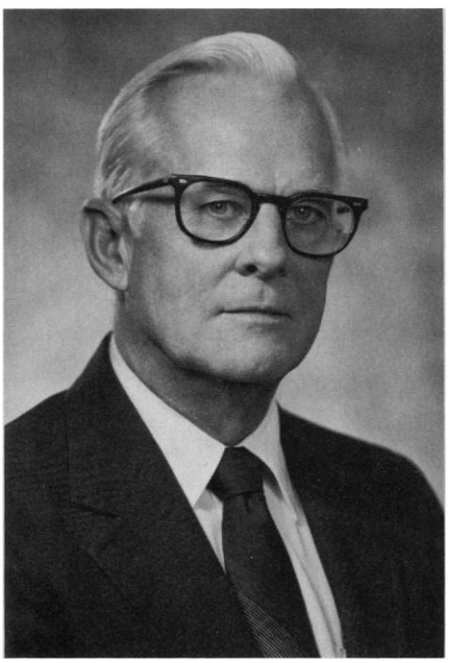
BEGINNING in the 1970s the world's largest agricultural research organization found itself under sporadic attack for funding outdated research, poor management of scientific programs, and responding slowly to new developments and technologies. Today, the focus of the Agricultural Research Service's mission is somewhat sharper and the overall quality of the research is improving. But doubts persist about whether the agency can modernize and adapt to new ways of doing business fast enough to keep American farmers competitive in world markets in the year 2000.

These concerns have been heightened by the decision of ARS's administrator, Terry Kinney, Jr., to retire. A career ARS scientist who worked his way up to the top job at the agency in 1981, Kinney proved to be a master at balancing the competing demands of Congress, commodity groups, and agricultural schools. He managed to shake up the agency at a time when its budget was declining in real terms and in spite of some serious tensions with ARS's parent department, the U.S. Department of Agriculture.

Kinney's stormy departure (see box), however, may set the stage for pivotal decisions on how the agency administers its research programs in the future. Kinney has criticized his boss, Orville Bentley, assistant secretary for science and education, for avoiding controversial decisions. And he fears the decision to replace him with someone from outside ARS, rather than a senior ARS official, may break the momentum in overhauling the agency's research programs and facilities. Bentley has named Ronald Dean Plowman, head of Utah State University's Department of Animal, Dairy, and Veterinary Sciences, to succeed Kinney.

But some legislators and scientists question whether the slow, steady pace of improvement set by Kinney for ARS's research programs is adequate and wonder if more fundamental changes are necessary. "What is needed is a very well-defined role, a focus on quality research, and strong leadership in light of today's times," says Winston Brill, vice president for research and development at Agracetus, a Middleton, Wisconsin, biotechnology company.

The emergence of large numbers of private agricultural biotechnology companies and the increasing use of new genetic engineering technologies by established firms also suggest that part of the agency's mission needs redefining. The companies are competing in an arena that ARS once dominated and their research activities often parallel those of ARS.



Terry B. Kinney, Jr. *Resignation has rekindled debate over ARS's future.*

In February, Representative George Brown, Jr. (D–CA), chairman of the House agriculture subcommittee on department operations, research, and foreign agriculture, called for a general review of ARS activities. This "is a time for mapping the future course" of ARS, said Brown, observing that "The face of production agriculture in the coming decades" could change dramatically with new discoveries in the biological sciences.

Brown's proposal, however, was rejected by Bentley. "Many of us thought we would not be surprised at what the panel would tell us," said Bentley, who also turned down Brown's request to have a blue-ribbon panel identify candidates to succeed Kinney.

ARS's research programs have, in fact, been subject to repeated congressional reviews since the National Research Council* issued its devastating 1972 report, which concluded that "much of agricultural research is outmoded, pedestrian, and inefficient." A stream of reports from the research council of the National Academy of Sciences, the Office of Technology Assessment, and the General Accounting Office† have also cited continued weaknesses and called for corrective action.

Overhauling the agency is no easy task, however. Its research programs are diverse, ranging over preservation of germplasm and creation of hybrid crop plants, animal disease and reproduction, control of crop pests, and human nutrition. These activities and others are conducted at a multitude of field stations located at land-grant universities and at stand-alone facilities scattered across the United States. The agency's budget in fiscal year 1988 totals $540 million.

ARS officials, moreover, do not have complete control over the agency's research agenda. Except for a small amount of contract work and competitive grants that agency scientists win from outside sources, ARS is dependent upon congressional appropriations. Congress often responds to pressure from special interests by directing the agency to carry out specific applied and basic research on designated crops, soil conservation, ground water pollution, or other issues related to agriculture. The agency's activities also are shaped by direct requests for assistance from commodity groups, industry officials, and agency scientists.

Nevertheless, Kinney has managed to carry out some substantial reforms. They started to occur shortly after he returned from a critical meeting at Winrock, Arkansas,‡ in June 1982 (*Science*, 2 July 1982, p. 33) that was sponsored by the Rockefeller Foundation and the White House's Office of Sci-

**Report of the Committee on Research Advisory to the U.S. Department of Agriculture* (Division of Biology and Agriculture, National Research Council, National Academy of Sciences, 1972).

†*The U.S. Department of Agriculture's Biotechnology Research Efforts* (U.S. General Accounting Office, October 1985, GAO/RCED-86–39BR).

‡*Science for Agriculture* (Rockefeller Foundation, New York, October 1982).

A Fight Over Kinney's Successor

Terry B. Kinney, Jr., is a man who cares deeply about the future of the Agricultural Research Service (ARS). So when he announced his retirement in December, he hoped to help select his successor. And Kinney, 62, who is leaving the agency for personal reasons, expected that his replacement would be a senior member of his staff, someone familiar with Congress and who would continue to overhaul agency research programs.

By February, however, it became apparent that Orville Bentley, assistant secretary of science and education at the U.S. Department of Agriculture (USDA), was looking outside the agency and that Kinney would not be involved in choosing his replacement. The hard-charging Kinney then began to challenge his boss's decision, first privately and later publicly.

The friction between Bentley and Kinney stems partly from their different operating styles. Kinney has a reputation for being aggressive and direct, while Bentley is more of a diplomat who tries to work things out. Kinney regards Bentley as indecisive. At issue, he says, was not "a matter of personal pride, but whether Bentley would pick a strong manager for ARS who would not hesitate to make changes."

The feuding between the two officials broke into the open on 8 April when Kinney sent ARS employees a copy of a letter delivered the same day to Bentley expressing dismay that non-ARS people were being interviewed and that nothing had been said to the staff. "If I have not during my tenure groomed any highly qualified successors, then I have indeed been a miserable failure as an administrator," said Kinney, who called for Bentley to advertise the job.

Bentley has refrained from criticizing Kinney publicly, but he was offended by Kinney's memo. On 15 April, Bentley announced the appointment of Ronald Dean Plowman, the head of Utah State University's animal sciences department, who had directed ARS's Logan, Utah, area office until 1984. At the same time, Bentley relieved Kinney of his post and appointed associate administrator Mary E. Carter to be acting head of the agency. Kinney was then swiftly moved from Washington to an office at Beltsville, Maryland, and was assigned the title of senior science adviser until his retirement takes effect around 1 July.

The selection process has left Kinney bitter and angry. He says that going outside ARS for an administrator is a break in tradition and is demoralizing to ARS's top management. The action, he says, may be perceived as a political appointment—and even if it is not, the stage may now be set for the job to become politicized after the November elections. Bentley should have relied on an expert panel to evaluate outside candidates to assure the selection of a strong administrator, Kinney argues.

Bentley says he rejected using a board of experts to screen candidates because he wanted to bring someone in quickly to maintain a sense of stability at the agency. Bentley's decision is producing few outcries. William E. Marshall, president of the microbial genetics division of Pioneer Hi-Bred International, Inc., gives Kinney high marks for what he accomplished, but says, "he didn't surround himself with the greatest thinkers." Some of the senior officials, Kinney supporters concede, were too heavy-handed in dealing with agency staff and overcentralized program management.

Just what changes Plowman, 59, will make in ARS's operations is not clear. While he plans no broad restructuring, some researchers hope the former animal geneticist will try to improve the environment for research. One of his first actions, however, may be to replace many of Kinney's top aides. In a 16 May memo to staff he said he would be assembling his own management team.

There is also some question about how long Plowman will remain in the job. Bentley has brought him into the agency on a special government appointment that allows him to retain his university post. It also permits him to earn $92,000 from a combined salary and retirement—close to his current gross income of $100,000.

Plowman says he is not a transient administrator and stresses that he is committed to making a contribution at ARS. He concedes, however, that he could be replaced when a new secretary of agriculture takes over USDA. Traditionally, the ARS position has been insulated from politics. ■ **M.C.**

ence and Technology Policy (OSTP). "There were some pretty hard things said about ARS," recalls Denis J. Prager, who was associate director of OSTP and is now a deputy director of the MacArthur Foundation. The panel of scientists and agricultural leaders called for ARS to restructure and devote more resources to basic science.

With the backing of legislators such as Jamie L. Whitten (D–MS), chairman of the House Appropriations Committee, Kinney has cut the number of field research stations from 147 to 122. He also slashed 320 positions from ARS's national program staff and used the savings to bolster the agency's research programs. His accomplishments, which have won him several presidential service awards, include:

- The creation of a postdoctorate program that brings 100 new Ph.D.'s into ARS laboratories each year for 2-year stays.
- The establishment of the Plant Gene Expression Center in Albany, California, which is run cooperatively with the University of California. This is funded in part from savings obtained by cutting the national program staff.
- The imposition of an overhead charge across all agency programs to finance renovations and equipment upgrades at ARS laboratories.
- The establishment of a 6-year program plan for identifying agency needs and directing research programs over time.

There is clear evidence that the agency is attracting better scientists, improving working conditions, and conducting better research. At the beginning of the decade there were relatively few ARS researchers using genetic engineering techniques. The agency now has more than 200 projects under way involving the use of biotechnology.

"They are making an effort," says Robert J. Knight, a 63-year-old horticulturist at ARS's Miami field station. "Things are better than they have ever been," says Knight, who has spent half his career at the 200-acre station that contains a collection of avocado, coffee, mango, and other tropical plants.

Still, reshaping ARS's research apparatus has been a slow process and researchers inside the agency, in industry, and at university laboratories say more needs to be done. "ARS, in many cases, maybe most cases, is not the leader of science," says Ralph W. F. Hardy, president of the Boyce Thompson Institute for Plant Research at Cornell University. The leaders are often found in universities or in biotechnology companies around the nation, he says.

Perhaps the most common complaint is that the agency needs to focus more on basic research. Anne K. Vidaver, head of the Department of Plant Pathology at the Uni-

versity of Nebraska, notes that ARS has an obligation to conduct high-risk research, but says that "one of the real problems in that organization is the inability to work on long-term problems." Such research, she says, "does not have a champion at ARS." The 1982 Winrock report also stressed that basic research was a prime responsibility of ARS and that the agency needed to make a greater commitment to it.

A fundamental constraint on the agency's ability to do more basic research is shortage of funds. ARS's budget has grown from $340 million in 1978 to $540 million this year. Not only have the increases failed to keep pace with inflation, but they are often directed to pork-barrel building projects for universities. Given the federal deficit, it is unlikely that Congress will significantly increase funding. The agency may therefore have no choice but to continue to redirect dollars away from marginal research to more productive, higher priority efforts.

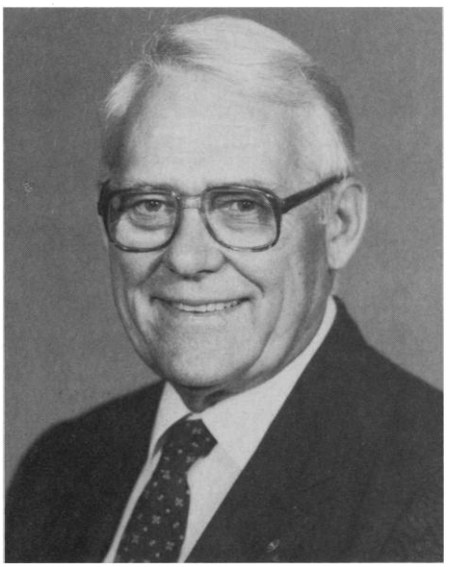
ARS's research dollars could be leveraged more effectively if more of the 122 remaining research stations could be closed. This has been a constant refrain in the critical reports on ARS and it appears to be a point on which virtually everybody agrees. Closing some ARS stations, says Theodore L. Huller, chancellor of the University of California at Davis, would allow ARS to concentrate scientists and amass further "intellectual horsepower" to lift the quality of a given research effort.

Bentley concurs, telling *Science* that ARS needs to "look at the locations and find out not what they have done in the past, but how they contribute today." But, politically, it is difficult to close even a single station. "We close them when a congressman or senator loses an election or dies," comments Kinney, noting that it may be possible to close only about a dozen more sites.

The agency's ability to expand its basic research effort is also limited by its obligation to do applied research. Indeed, Kinney says that the agency cannot afford to forget who its clients are—Congress, the Executive branch, and the agriculture industry.

Kinney and Bentley say that the agency has struck a balance between meeting the near-term needs of cotton, corn, beef, cattle, and other commodity groups while conducting longer term research. But such research, they say, should be conducted for the purpose of identifying a specific problem. Research just for the sake of knowledge, they add, is the domain of the universities.

Not unexpectedly, opinions vary widely within and outside the agency about whether, in fact, there is a balance. "I think that the ARS is undoubtedly confused about what is its mission," observes Robert Goodman,



Orville G. Bentley. *"We don't need any more reorganization right now."*

executive vice president of research at Calgene, Inc., a Davis, California, biotechnology company.

Some agency scientists, who asked not to be quoted, suggest that too much effort is spent on combating fruit-fly invasions, helping Florida juice producers improve the flavor of packaged orange juice, or identifying the most suitable potatoes for French fries. In many instances, Bentley admits, such research should be left to industry.

Plowman, Kinney's successor, is expected to try to refine the focus of research and ease bottlenecks within the bureaucracy by relaxing ARS's centralized management system. Plowman, who retired from ARS in 1984 after 27 years at the agency, already has circulated a memo asking scientists for ideas on improving the research program.

Bentley has made it clear, however, that there will be no major shifts in ARS's structure or policies at this time. Kinney made sweeping changes as part of his drive to overhaul ARS, including layoffs at national headquarters and a reduction from 25 to 8 in the number of managing area directors. Citing the "atmosphere of uncertainty" that ARS personnel have had to cope with, Bentley says he has told Plowman that "we don't need any more reorganization right now."

That proclamation has been greeted with cheers from many agency scientists, but university, industry, and government officials worry that this may signal a period of complacency at ARS when much remains to be done. The agency, in fact, has yet to effectively address a number of weaknesses.

ARS is faulted, for example, for not using formal advisory panels of outside scientists and other experts to help set research priorities. Another problem, which top ARS officials recognize, is that scientists are given permanent status after 1 year at the agency. This policy is mandated by civil service rules, but officials say they really need 3 to 5 years to evaluate a scientist.

The National Research Council, in a 1987 report (*Science*, 7 August 1987, p. 597) prepared at Kinney's request, also noted that the agency's system of peer review of research proposed by ARS scientists needs strengthening. These reviews do not have a direct bearing on whether a project is funded and the selection of reviewers is based on a list provided by the scientist.

For those researchers who excel, the rewards are limited to salary increases. Achievement does not necessarily mean that a federal scientist can command more funding, a larger staff, or better laboratory equipment. A stronger reward system, the research council says, is needed at the agency.

That, says one scientist at the University of California at Davis, is important for fostering creativity. He notes that in many ways researchers working on grants from the National Institutes of Health or National Science Foundation have more freedom and flexibility. "They can do anything they want for 3 years. It lets people go off in wild and crazy directions."

Finally, a major concern is the aging scientific staff, where the average age is 47, virtually the same as when Kinney took over as head of the organization. "Close to 40% of these people will be eligible for retirement in about 6 years," notes Bentley. The agency will be looking closely at what this means for the research agenda as well as examining policies that impede ARS scientists. As a start, Bentley says the agency may begin asking scientists at "the bench level" to assist in the planning of agency research programs.

In spite of this litany of problems, Bentley defends the agency's record of performance in recent years, noting that it is doing more and more frontline work in biotechnology. He cites as a case in point the work of Athanasios Theologis at the Plant Gene Expression Center, who has cloned genes that regulate aging in plants. Critics, he says, fail to recognize that the agency "is asked to serve a lot of different kinds of people."

Nevertheless, Bentley concedes that the agency still needs to address lingering problems that could have been tackled earlier. If the agency is unable to keep its research program focused, congressional aides say, it risks seeing some of its research shift to the university sector and industry. In an era of declining farm populations and tight federal budgets, ARS is likely to be judged by stiffer criteria. ■ **MARK CRAWFORD**