other companies make reagents for it. Hoffmann–La Roche has now begun to market an FPIA device of its own. The rate cited for the Hitachi machine was misquoted: it should have been 1500 to 1800 results an hour.—ELIOT MARSHALL

Pork Barreling

In his editorial, "Regularizing 'pork' " (12 Aug., p. 769), M. Granger Morgan suggests capitulating to the political forces that more and more are diverting research funds away from merit review and straight into the pork barrel. Morgan states: "If 'pork barrel' science and engineering cannot be stopped politically, and arguably serves positive social ends, we should be trying to regularize the practice in a formal program, not terminate it." I feel this a dangerous concession and one that will invite more players to join in the pork barrel game.

Recently, academic pork barreling took a turn for the worse in both the House and the Senate. On 20 June, for example, the Senate subcommittee for rural development, agriculture, and related agencies of the Committee on Appropriations earmarked $8.25 million in the U.S. Department of Agriculture (USDA) competitive grants program for research at the University of Arkansas, Kansas State University, Iowa State University, the University of Iowa, a Midwest plant biotechnology consortium, and the city of Cedar Rapids, Iowa. While the objectives in the appropriations may have been meritorious—food safety, alternative pest control, and biotechnology among them—it is a disservice to the nation for Congress to designate the location of research, particularly when it includes handing over nearly a quarter of the $40.8 million originally appropriated for competitive grants.

Widespread circumvention of the merit review process is eroding the foundation of our system for federally supported research. This system depends on a delicate balance between federal funding of research and federal control of research. Further, it entrusts the scientific community with determining the nature of our research and with ensuring its quality. Pork barreling by the scientific community compromises our objectivity and integrity. Consequently, we stand to forfeit our right to play a significant role in federal resource decision-making.

Fortunately, through the combined efforts of the scientific community, academic and agency administrators, and congressional leaders, the location-specific earmarks on the USDA competitive grant funds were removed when the Senate passed the fiscal year 1989 Rural Development, Agriculture, and Related Agencies Appropriations Bill in the beginning of August. It is important, though, that the participants who pressed for this reversal remain vigilant until the Senate-House Conference Committee acts on the bill. This example shows how collective protest against pork barreling can bring it to a halt, at least in its most extreme cases. We do not have to "regularize" a practice we know is fundamentally unacceptable just because it "shows no sign of abating." Certainly not when there is evidence that we can bring about the abatement.

I also disagree that pork barrel science and engineering "arguably serves positive social ends." First, while the goals of upgrading the quality of science and engineering throughout the country and of enhancing the economic viability of particular regions are noble, such social and economic engineering should not be funded with monies allocated for fundamental research and research facilities. These monies must be awarded on the basis of research performance, intrinsic merit, and relevance of the research. To do otherwise when research dollars are scarce will result in spreading

resources so thinly that the quality of research in the United States would fall to a common level of mediocrity. Attempts to upgrade the research activities and economy in a particular region by pulling the rug out from under research that meets objective criteria for deserving funding is woefully shortsighted. In the long run, it weakens our strongest research and undermines our economic competitiveness. Equating federal research monies with "vital regional development resources" is bad mathematics—we would not like the numbers we would end up with.

At a time when funding for research is becoming scarce while scientific opportunities are increasing, we should be helping set priorities, not climbing into the pork barrel. We should also work together to convince Congress of the great need to improve the research infrastructure in U.S. universities and colleges. There is growing recognition of that need, as Morgan indicates, with the introduction of the University Research Facilities Revitalization Act (H.R. 1905) and in the fact that similar language was included in the trade bill passed by Congress but vetoed by the President. We need these improvements to take advantage of new opportunities in science, to provide better training for students, and to improve our ability to address the nation's problems that require scientific solutions. We should redouble our efforts to ensure that adequate funds are provided to conduct good science rather than resorting to pork barrel politics.

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Response: I share Hess's belief in the value of peer review in allocating scientific R&D resources. There is, however, strong empirical evidence that Congress is unprepared to accept peer review as the sole basis for allocation and believes that other considerations, such as regional economic development, ought to figure substantially in at least some decisions. Hess argues that the answer lies in persuading Congress that they are wrong.

Both as individuals and in various groups, leaders of the nation's research establishment have made this argument repeatedly. I have myself made it with my own congressman who chairs the science, research, and technology subcommittee of the House Committee on Science and Technology. The clear evidence is that Congress does not find the argument persuasive. Members have strong political and philosophical reasons for believing that factors other than peer review should figure in at least some R&D allocation decisions. The steadily growing volume of pork barrel R&D provides strong evidence that our arguments are going nowhere.

In the face of this evidence I have concluded that the most effective defense is to "regularize" the process. Force the Congress to make a few explicit decisions that limit the overall level of R&D resources that can be allocated on a basis broader than conventional peer review. Then hold the line. Hess may not like this approach, but I believe it is better than risking the growing erosion of the peer review process that results from large numbers of individual congressional decisions, most of which are not being as effectively countered as the one Hess outlines in his letter.

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