(*Science,* 14 April 1989, p. 140) and the Administration requested $100 million for 1991. Congress, however, cut it back to $73 million. If the earmarked construction money had been applied to the competitive program, notes Charles Hess, USDA's assistant secretary for science and education, "We would have been much closer to our goal."

In fact, the earmarking may have jeopardized that goal. Because more money will be needed to complete many of the construction projects, the Office of Management and Budget reckons that Congress has committed USDA, at least implicitly, to $400 or $500 million worth of not yet funded projects—in a sense, giving away the money that might have been used to build up competitive research. Unless USDA and the universities bring these trends under control, an OMB official says, OMB may "abandon" the research community to the mercies of Representative Jamie Whitten (D–MS), chairman of the House Appropriations Committee. Whitten has long resisted growth in USDA's competitive grants program. His view is that he and his fellow congressmen can judge the merits of proposals as well as any scientific peer group.

The pork-barrel route is now so well trodden, however, that it will prove difficult to block. What's needed, according to most observers, are well-funded programs to which universities can apply on a competitive basis. In 1988, Congress took a step in that direction by authorizing the National Science Foundation to establish a facilities program. But it appropriated a paltry $19 million for it in 1990 and $20 million in 1991. But even that's more than the Administration wanted; it requested no funds at all for 1990.

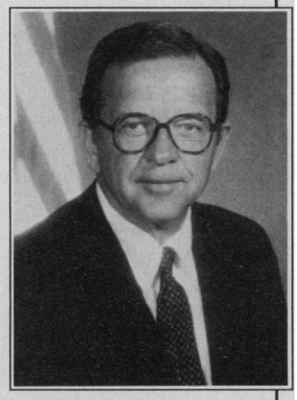
In the meantime, to keep earmarking at USDA under control next year, Hess is thinking of asking all universities who want new facilities to cooperate in a priority-setting exercise. Brown also says he is trying to enlist the President's support "to establish a long-range funding scheme for research facilities in general." Its purpose is to "diminish the effort to earmark funds by individual members of Congress," by assuring them that their state's needs will be cared for in a more orderly process. But these plans are still vague, and many observers are skeptical that old patterns can be changed.

Several years ago a Presidential panel called for a national effort to fund university infrastructure at an annual rate of $250 million. The idea was never adopted, but, as one congressional staffer says, "We're spending about the same amount of money on these facilities, but without a coherent program in place." ■ ELIOT MARSHALL AND DAVID P. HAMILTON

Alaskan Pork: Aurora Fantasia

There's a lot of electricity in the Alaskan air. Some of it is real—a million amps circulating 60 miles above the state in the form of the *Aurora Borealis*. And some of it is metaphorical: controversy over research projects funded by the Department of Defense for harnessing the energy of the aurora and bringing it to Earth. Most physicists say the DOD projects, which will bring more than $37 million to the University of Alaska at Fairbanks next year, are little more than a glut of pork brought forth by the fantasies of a powerful senator.

The senator is Ted Stevens of Alaska, ranking minority member of the Defense Appropriations Committee. Stevens seems to have been turned on to auroral projects in September 1988 when he heard talks in Washington by Alfred Wong, physics professor at UCLA, and Syun Akasofu, director of the Geophysical Institute at the University of Alaska. Akasofu's institute runs the High Altitude Auroral Research Project (HAARP) and the Poker Flat Research Range, where rockets for auroral research are launched. Fourteen months later, a $9-million allocation for HAARP and $10 million for an upgrade of Poker Flat appeared in the DOD's fiscal year 1990 budget.



Visionary? *Senator Ted Stevens of Alaska.*

But that was only the first helping of Arctic pork. This year the DOD budget includes $10 million for HAARP, $25 million for a supercomputer center above the Arctic Circle (expected to be at the University of Alaska), and $2.5 million more for upgrading Poker Flat. All this largesse flows from Stevens' enthusiasm for the borealis. "We have in Alaska," Stevens said on the Senate floor, "what I consider to be one of the most exciting research projects that I've ever encountered. If we could harness this electrojet—this inexhaustible supply of energy in space—and bring it to Earth, we would have a different society. Not only here [in the United States] but in the world." What Stevens has in mind is a three-pronged project, with HAARP carrying out ground-based experiments, the supercomputer doing theoretical modeling, and Poker Flat conducting rocket-based experiments.

Most scientists think Stevens' vision bears no relation to reality. Robert Park, professor of physics at the University of Maryland, called it "wacky." An aurora geophysicist who asked for anonymity told *Science* the idea of harnessing the aurora for earth-bound energy systems is "crazy." The soft underbelly of Stevens' plan is that the electrojet of the borealis—including the million amps and gigawatt or so of energy—is distributed over a huge area. As a result, the current density is only a few amps per square kilometer. That's less current density than is found in a typical household toaster—by a factor of 10^{13}. Extracting energy from such a field would require an antenna the length of a wire strung from Mt. McKinley to Mt. Fuji.

Not too likely. So researchers at the University of Alaska—not wanting to look the gift pig in the mouth—have scrambled to come up with more plausible justifications for taking the loot. Akasofu claims the needs of national defense and basic energy research are driving his program, and that worthwhile science will emerge. The supercomputer, he says, will be used to model global change as part of the DOD Strategic Environmental Research program. HAARP itself, he adds, will include basic research into the auroral plasma, which will help fusion researchers study their plasmas.

Richard Brandt, principal scientist at the Office of Naval Research, who handles the government's involvement in HAARP, justifies the grant as promoting basic research aimed at using the aurora as a communications antenna—an idea he admits is far off.

Whether those claims are mere window-dressing or not, even Stevens admits that peer review by the physics community—to which earmarked DOD projects are not subject—would have precluded the Alaskan awards. According to Fred Spilhaus of the American Geophysical Union, in Senate hearings Stevens argued that although the auroral projects "could solve the country's energy problems," they "would never have been allowed to happen under a peer review process."

■ PAUL SELVIN

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