JAPAN'S EDUCATION MINISTER

Vocal Critic Gets Chance to Put His Ideas Into Practice

Akito Arima, a physicist turned politician, joins the government at a time of growing pressure on the country's education system

TOKYO—Physicist Akito Arima is one of Japan's most persistent critics of the country's science and educational policies. As president of the University of Tokyo from 1989–93, he led politicians, business leaders, and journalists on tours of the university's decrepit labs to showcase the nation's neglect of basic science. As a member of governmental advisory councils, he has pushed for a fixed-term system to replace the lifetime employment of university professors, campaigned for bright students to be allowed into college a year early, and advocated outside reviews of teaching and research activities at universities and national labs.

Now, says Arima, those recommendations "have boomeranged." At age 67, he has become head of Monbusho, the Ministry of Education, Science, Sports and Culture (*Science*, 7 August, p. 759). The first bona fide scientist to hold the job in 50 years, Arima will have a chance to implement some of his own advice. He must also confront a plateful of issues, from the merger of Monbusho with the Science and Technology Agency (STA) to reforming Japan's rigid educational system.

His colleagues are betting on him to succeed. "I am hoping he will be able to do a lot for basic science," says Sakue Yamada, a director of the High-Energy Accelerator Research Organization (KEK) in Tsukuba. Yoji Takikawa, a physics teacher at International Christian University High School and an education activist, says, "It's the first time we've ever had a minister who really understands the problems and challenges facing [primary and secondary] science education."

Educated at the University of Tokyo, Arima joined the faculty and compiled a distinguished record in theoretical nuclear physics. But it was only after being elected its president in 1989 that he became a force in science policy. "He really succeeded in raising science budgets," says Yamada. When his term ended, he became president of the Institute of Physical and Chemical Research (RIKEN), a world-class facility outside Tokyo run by STA. He also served on numerous governmental advisory committees, using them as a forum to push his reform agenda.

With two papers last year in *Physical Review Letters*, Arima says, "I still am enjoying physics." A prize-winning haiku poet, he is also a regular at school science fairs—including an appearance as Galileo to explain the movement of the planets. That playfulness, combined with his diminutive stature and ever-ready grin, have made him the most widely recognized spokesperson for Japan's scientific community.

That reputation helped to earn him a place at the top of the ticket for the ruling Liberal Democratic Party in the July campaign for the upper house of the Diet, assuring his election. He received the Monbusho portfolio in the government formed 30 July. Although he's new to electoral politics, Arima is intimately familiar with the issues facing the ministry. For example, he served on the government-wide Administrative Reform Council that recommended its merger with STA. Until this spring, Arima also chaired the Central Council for Education, a Monbusho advisory body that has proposed a shorter school year.

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No surprises. Arima has spoken out on many of the issues facing Monbusho, Japan's education ministry.

A major challenge for the new minister is reconciling Japan's widely reported plan to dramatically boost spending on science with efforts to rein in a budget deficit swelled by 8 years of economic stagnation. The clash has created a situation in which overall science spending will rise by 21% at the same time that the operating budget for many big science facilities has been cut by 15% (*Science*, 1 May, p. 669). Arima says that plans for an additional 15% cut have been shelved, although it is not clear whether budgets will be restored to previous levels. And giving institute directors more discretion in shifting money between budget categories is "beyond my power," Arima says.

In the following edited transcript of a 25 August interview in his office, Arima explores four major issues he must face.

On support for academic science:

I'm very happy about the rapid increase in the budget for science and technology as a whole. ... But I have one criticism. [Monbusho's] share is too small. The most important contributions in basic science and technology come from university professors. However, [the largest] share of the budget for science and technology goes to other ministries. Only 21% of [total government spending on science] goes to [Monbusho's] national laboratories and universities. I want to increase this.

On program evaluation:

I'm stubborn on this, continuously saying we need [accountability] plus external reviews. But I'm very happy [with the progress we've made]. When I introduced [external reviews] to the University of Tokyo in 1993, almost all the professors were very unhappy. However, many universities and many national laboratories now have undergone external reviews. So, the question now is if these external reviews are really effective. Monbusho is trying to establish an institute to oversee and participate in the external reviews. If this institute gives a good report about a certain project, then that project will [get greater] support. But if this institute says no, this university's activities are very bad, then we will try to reduce their budget.

On merging STA and Monbusho:

STA has its own culture and the Ministry of Education has its own culture. At the Ministry of Education, basically, individual professors or individual researchers propose projects, [reviewers] argue which is best, and finally the Ministry of Education decides. On the other hand, at STA, [new initiatives] are mostly top-down policies. So last year I was very reluctant to merge these two ministries. However, now I see the good aspects. For example, the Ministry of Education is interested in education, and STA is interested in science education. Up to now, these two [activities] have been done separately. Now we have already started to merge them. Or take STA's big budget for space science, accelerators, oceanographic [research],

and so on. We have similar activities in universities. If we merge these two ministries, big science will get stronger support and we can avoid duplications and inefficiencies.

[The idea of keeping STA as a separate agency under Monbusho] could happen. In that case, the different cultures will be preserved. We also have a project team that is [discussing whether] to merge, say, the Institute of Space and Astronautical Science with the National Space Development Agency.

On educational reform:

We're very good at elementary education. If you look at international comparisons, Japanese students do very well—third in the world in science and mathematics. However, the problem is that students have to learn [by memorizing] and have no chance to practice their knowledge. So we decided to close schools on Saturdays. We will also try to increase the number of [educational activities] outside school. I hope kids will have more chance to learn by themselves and to develop their individuality, creativity, and originality.

At the same time, our Central Committee for Education has recommended two things. If there are certain students who learn things slowly, our teachers should educate those slow students more carefully. At the same time, we should give [bright students] an advanced education.

–DENNIS NORMILE

APPROPRIATIONS

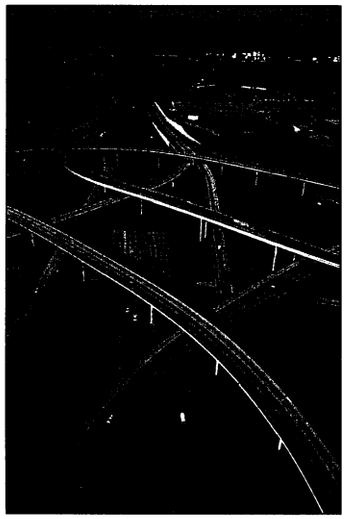
Legislators Get Creative With New Crop of Earmarks

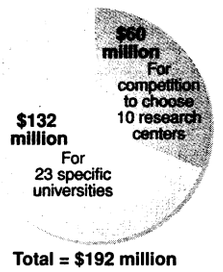
A budget surplus and a fall election invigorate the traditional practice of channeling money to specific universities

A researcher who wins a multimillion-dollar federal grant can usually recall in excruciating detail exactly what it took to prevail over some stiff competition. But not Jim Bose, an engineer at Oklahoma State University in Stillwater. Bose says he can't explain the intricacies of how his lab received a $2.5 million grant earlier this year to design a "smart bridge" that automatically energizes ice-melting heat pumps when the weather turns nasty. The reason: The project didn't have to go through the labyrinthine peer-review process, because one of his state's senators tacked the 3-year award onto a mammoth federal transportation spending bill signed into law in June.

"I'm not sure how it happened, but the university is real pleased, and so am I," Bose says about getting a chance to work on the innovative concept. He is, however, a bit uncomfortable about how the windfall came about. "When you get the money, you think it's a great way to go," he says. "But when you see someone else get it, you kind of wonder about the process."

Bose isn't the only scientist with mixed emotions about the long-controversial practice of earmarking. Each year thousands of researchers benefit from such efforts by well-positioned lawmakers to funnel money to local institutions, often over objections from Administration officials. Budget woes and efforts by Republican leaders to make good on promises to cut government waste had curtailed such spending in recent years. But legislators' taste for bacon has been revived by a predicted budget surplus, the Supreme Court's rejection of the president's authority to veto individual items in a spending bill, and the fall election campaign. "The political trend is very strong; ... there is a tendency toward spreading the largesse," says Nils Hasselmo, the new president of the Association of American Universities, a group of 62 leading research institutions that has taken a strong stand against earmarking. Congress won't finish work on the 1999 budget until next month, but its actions so far suggest that earmarks for science projects are running close to last year's total of a half-billion dollars which, according to a survey by the *Chronicle of Higher Education*, represented a 67% jump from the 1995 level.





Peer-review bypass. The new federal transportation act provides nearly $200 million for research projects, but legislators have already chosen most of the winners.

Exhibit A in this year's panoply of pork is the $2.3 billion Transportation Equity Act for the 21st Century. In addition to providing funds for campus buildings with no apparent connection to transportation studies, the law created what amounts to a mega-earmark: $132 million to 23 specific institutions—including Oklahoma State—interested in studying everything from global warming to auto accident injuries. Although projects like the self-heating bridge may have merit, says Tom Maze, head of the Center for Transportation Research and Education at Iowa State University in Ames, the earmarks mean that a growing share of a stagnant transportation research budget is not subject to peer review. In a nod to the value of academic competition, Congress did stipulate that the department spend another $60 million for 10 university-based centers chosen by peer review. But that doesn't compensate for the growing restrictions on the research budget, says Maze: "They used to hand out bridges; now they are doling out transportation research centers with a minimum of oversight."

Just how much fat is added to a bill often depends on the temperament of the committee chairs who oversee the 13 individual appropriations bills that fund all federal activities. For instance, relatively little biomedical research pork has made its way into the House version of the key spending bill, mainly because Representative John Porter (R–IL), who chairs the appropriations subcommittee for education, labor, and health and human services, persuaded his colleagues that they should allow peer reviewers to make funding selections. Indeed, the report his subcommittee produced in June—which recommended a 9.1% increase for the National Institutes of Health—pledges to give NIH staffers "no directives" on centers or on "particular diseases." But the Senate version of the bill, to be crafted this week by a panel led by Pennsylvania Republican Arlen Specter, is expected to be more explicit about its preferences.

Even the relatively clean NIH bill, however, indicates that lawmakers are getting more sophisticated about avoiding earmarking controversies by using seemingly vague recommendations. The House report, for example, calls on the National Cancer Institute (NCI) to fund a new center for proton beam therapy,

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