AAAS Meeting: Science and All That Jazz

Global change and science education dominated the scientific sessions at the 156th annual meeting of the American Association for the Advancement of Science, held on 15 to 20 February in New Orleans. But beyond the especially topical sessions, there was, as usual, a panoply of sessions (over 200 in all) covering the entire breadth of science. Between these and the natural charms of New Orleans, augmented by the impending Mardi Gras celebration, participants were never at a loss for something to do. But if participants were delighted with the venue, the AAAS was less than delighted with the number of attendees. According to Arthur Herschman, head of meetings and publications for AAAS, only about 3500 people paid to attend the meeting, compared with 4900 the year before in San Francisco.

Herschman says attendance suffered because of low AAAS membership in the area. He estimates that 30% of the people who usually go to the annual meeting are local area members. There should be less difficulty in drawing a crowd for the 1991 annual meeting in Washington, D.C., where AAAS membership is high. Herschman does point to one bright spot at New Orleans: programs for high school and elementary school students attracted more then 10,000 students.

What follows is an idiosyncratic sampling of the sessions held over the 5-day meeting prepared by *Science* correspondents Joseph Palca and Eliot Marshall.

Dallas AIDS Survey Raises Expectations

How prevalent is the AIDS virus in the U.S. population? Preliminary results from a survey conducted last fall are giving researchers confidence that they may soon be able to take a direct stab at answering this currently intractable question.

The widely touted estimate—that 1 to 1.5 million are infected in the United States—is based on screening groups such as blood donors, military recruits, and pregnant women in selected hospitals. But data from these special subpopulations do not give an accurate picture of the population at large. So researchers have proposed a more direct approach: test the blood of a large random sample of U.S. residents.

The Public Health Service has endorsed the plan, known as the National Household Seroprevalence Survey, and has instructed the National Center for Health Statistics to pay for it. NCHS has, in turn, contracted Research Triangle Institute in North Carolina to select households at random, send in a phlebotamist to draw blood and a technician to administer a questionnaire, and tabulate the results. Sounds straightforward, but will Research Triangle researchers be able to identify a representative, unbiased sample to select from? Will respondents give frank answers to questions about their sexual behavior? Can blood samples be collected in a manner that would preserve anonymity? And most important, will anybody—especially those in high-risk groups—agree to participate?

The answer to most of these questions—which have haunted even the proponents of the plan—now appears to be a tentative yes, according to early results from a pretest of the survey conducted in Dallas at the end of last year. Despite noisy opposition from one Dallas gay activist group, Michael F. Weeks of Research Triangle Institute reported at the New Orleans meeting that 1450 households agreed both to donate blood and to complete the questionnaire—an 80% response rate.

Based on lessons learned from an aborted attempt to run a pilot survey in Washington, D.C., and a successful pilot survey in Pittsburgh, researchers felt they had addressed the concerns—primarily of confidentiality—expressed by those opposed to the survey. Weeks says initial data indicate that at least some people from high-risk groups participated, and researchers are now trying to determine whether they took part in representative numbers. One test of that will be to determine the prevalence of antibodies to hepatitis B virus. Since hepatitis B prevalence is already known for the Dallas area, and since the AIDS virus and the hepatitis B virus are often found in the same population, if the AIDS survey turns up wildly different numbers, researchers will know something is wrong.

As an additional check, researchers have already gone back to nonresponders to ask why they refused to participate. Weeks says that their answers suggested no moral objection, but rather a fear of needles or disinterest in participating in any survey, factors less likely to skew the results.

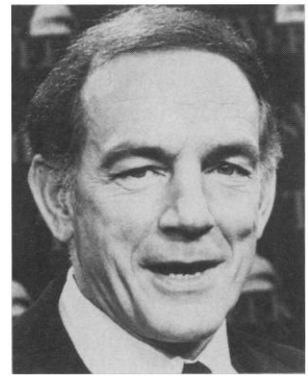
Data analysis from the pretest should be completed by April. Once the Dallas results are in, federal health officials will determine whether to proceed with the national survey. ■ **J.P.**

The Geopolitics of R&D

"Them that has, gets; them that don't have, don't get." That's the way Senator J. Bennett Johnston (D–LA) summed up his views on how research grants are parceled out by the federal government. Johnston's gibe, delivered at a session organized by academics who think the traditional peer-review system has favored the haves (Massachusetts, California, and the like) over the have-nots, reflects a growing frustration in Congress with the old ways of funding science. The frustration is often evident in pleas for pork barrel projects and distrust of the National Science Foundation (NSF).

Since 1980, NSF has responded with an effort called the Experimental Program to Stimulate Competitive Research (EPSCOR) designed to help research-poor states catch up, and foundation officials were also on hand in New Orleans to talk it up. But they had a lot of convincing to do when they faced the host-state senator.

Johnston is quick to point out that Louisiana is one of a group of 17 states at the bottom of the totem pole, identified by the NSF as receiving the smallest share (6%) of federal basic research funds. The five ranked at the top—California, Massachusetts, Maryland, New York, and Virginia—have the most prestigious universities and receive the biggest share (over 50%) of federal money.

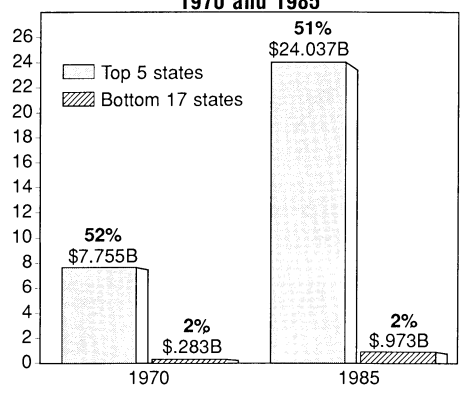


Senator Johnston: *"I have minimal high regard for peer review."*

To Johnston, who chairs the Senate energy appropriations subcommittee and sits on other key R&D panels, "Old school ties" on the East Coast play too big a role in deciding who wins and who loses. "I have minimal high regard for the system of peer review," says Johnston.

In response to such criticism, Joseph Danek, EPSCOR's director, said that the aim of his program is to help states develop the technical infrastructure that will enable them to become consistently more effective in winning grants in the future. Spending a total of $49 million since 1980, NSF has helped to pay for critical self-review and self-improvement by state institutions, an effort to which the states themselves contributed $155 million. As part of the process, EPSCOR collars nationally renowned scientists and brings them in to give advice. They meet with an EPSCOR committee of local political, industrial, and university leaders, which develops a strategy for self-improvement and then oversees a plan to carry out that strategy. According to Danek, the states learn how top academic institutions in the nation operate, and the visitors also learn something new, often discovering high-quality science in institutions they had not known about.

NSF intends to double the annual EPSCOR budget to $10 million starting this year. With help from the President's science adviser, who has voiced support for EPSCOR, NSF also may try to persuade other agencies to adopt basic science outreach programs of their own. Meanwhile, 15 of the EPSCOR states and Puerto Rico last year retained a full-time Washington agent, H. Stewart VanScoyoc, to represent their interests in Congress and the bureaucracy.



Johnston says this is great news, but "no big deal." He wants to see a shift in NSF's fundamental grant-giving pattern, and says that Congress is not likely to double NSF's budget until that happens. He asks: "How can the have-not states be enthusiastic if they can't get a fair share of the pie?"

"You give me the money and I can form a great research institution in Dry Prong, Louisiana, or Podunk, Maine," he quipped. ■ **E.M.**

Counting on New Nukes

Could rising oil prices and mounting concern over global warming lift the nuclear industry out of the doldrums? That's certainly what industry spokesmen are hoping. A tax of $2 to $5 per ton of carbon emitted by coal-burning plants—touted by speakers at some AAAS sessions as a possible way to curb global warming—could create "an entirely new ball game," said American Nuclear Society president Walter Loewenstein.

But the first order of business, according to speakers from the United States and the Soviet Union, is to reassure the public that the next generation of reactors will be less risky than the last.

Most of the new reactor designs exist only on paper, however. The Department of Energy recently approved grants of $50 million to General Electric and Westinghouse to refine their concepts for small (600-megawatt), ultrasafe reactors. One common objective, according to a report from the Electric Power Research Institute, is to design core cooling mechanisms that will remove heat for at least 3 days, even if the pumps stop operating and the reactor operators do nothing. The chief innovation has been to add some elevated water tanks, providing a gravity-driven supply of coolant. The efficiency of the new approach has not been tested, but the goal is to achieve savings through simplification, so that over a period of 10 years, the new reactors will be 10% less costly to run than alternative types, and 20% less costly over 30 years.

Igor Slesarev of the Soviet Union's Kurchatov Institute of Atomic Energy revealed that his nation's nuclear plans are as uncertain as its political future. "We have very active greens [environmentalists]," he said, "and we must demonstrate to the people that we have safe reactors." The government has already promised to close down 6 of the oldest 16 RBMK reactors—the type that exploded at Chernobyl—but it cannot count on replacement power from other sources. Each case is being reviewed for its economic impact before a decision is made.

But, while Westerners struggle to come up with safer designs, Japan feels confident that it has already achieved very high levels of safety and efficiency in existing plants, according to Yoshitsugu Mishima, president of Japan's Nuclear Power General Safety Center. For example, the worker exposure rates in Japan are soon expected to go below

AAAS Rides Electronic Wave

If electronic journals are the wave of the future, then the cry from AAAS officials is "Surf's up." The association has decided to get ahead of the curl by forming a joint venture with OCLC, the Ohio-based Online Computer Library Center, to produce a peer-reviewed electronic science journal.

The new journal, expected to come on line some time in the next 18 months, is intended to complement traditional print publications—including *Science*—not replace them, says Richard S. Nicholson, executive officer of the AAAS and publisher of *Science*. "It will provide more flexible delivery of information to the scientific community," Nicholson said last week when he announced the new venture.

OCLC currently provides a computerized cataloguing service to more than 10,000 libraries around the world. The joint venture aims to take advantage of OCLC's data delivery expertise and AAAS's experience with scientific publishing. Although many details remain to be worked out, the idea is that every aspect of the journal's production will be handled electronically, from manuscript submission to editing and peer review. Once an article has been "accepted," it will be made instantly available to all subscribers via computer. Data on which an article is based could also be made available in electronic form.

AAAS officials won't say much about their expectations or marketing plans. K. Wayne Smith, president and chief executive officer of OCLC, says he expects the new journal "will benefit both the individual information users, who are members of AAAS, and the institutional users whose libraries are members of OCLC." ■ **J.P.**

50 person-rem per year. By comparison, a paper by U.S. nuclear design specialists Edwin Kintner and John Taylor calls for reaching a goal of 100 person-rem per year in the next generation of reactors.

Mishima said that Japan's rate of unintended shutdowns (0.5 scrams per reactor year) and its rate of fuel leakage (less than one per million fuel rods) are already the lowest in the world. He saw no pressing need to develop the small, passively safe reactors, which he considered to be less efficient than standard models now slated for use in the 1990s. But a panel of experts is now reviewing a variety of proposed mini-reactors and will report back with recommendations. He suggested that small, ultra-safe systems, though somewhat less efficient, may yet prove marketable as an export item, to be sold mainly to developing nations.

■ **E.M.**

U.S. Math: Not Asking Much

Anyone comparing Japanese and U.S. math education quickly runs up against a paradox: U.S. school students report they spend more time both in and out of school on math and think they are doing well at it, yet they still rank well behind Japanese students on math achievement tests.

Jerry P. Becker of Southern Illinois University at Carbondale cited 1987 data showing that Japanese students not only outperform their U.S. counterparts, "but *average* students in Japan show greater achievement than the top 5% of U.S. students." And Floyd Mattheis of East Carolina University presented equally telling data from a study comparing junior high school students in Japan and North Carolina. It shows Japanese students out front at every age group in a test that measures six logical thinking operations.

Could it be that Japanese students are just plain smarter? "There is no evidence to support this assertion," says Becker. But pinning down the reasons for the difference is not easy. The two educational systems are culturally so dissimilar that direct comparisons are difficult to make.

But Jon D. Miller, director of the public opinion laboratory at Northern Illinois University, reported a bit of good luck that may provide some insights. In 1987 Miller and his colleagues began collecting data for the Longitudinal Study of American Youth. At about the same time, Masao Miyake and his co-workers at the National Institute for Educational Research in Tokyo were planning the National Study of Japanese Youth. Although neither group knew of the other's existence, a number of the measures were either identical or comparable. Miller says the two groups are now engaging in a fax collaboration, sending data and design queries back and forth as both studies continue wide-scale sampling.

There are already some interesting results, although Miller warns that conclusions must be tempered by the fact that the Japanese sample may not be representative of all Japanese schools. Despite their math prowess, Japanese students do not have the same expectations for advanced degrees as their U.S. counterparts: 36% of American 8th graders expect to pursue some graduate degree, as opposed to only 1% in Japan. U.S. students seem to enjoy math more, spend more time working on it, and have more anxiety about studying it.

Miller thinks that one thing is clear: "The reason American students think they're good at [math] is they are good at it. . . . But they're not being asked to do much." Japanese students are pushed harder, with topics like algebra, probability, and estimation introduced far earlier into the curriculum, Miller noted. The same is true in many other countries where math achievement is higher than the United States, said Miller.

■ **J.P.**

Soviet Reforms: Promises, Promises

Like all other segments of Soviet society, the scientific community has been fundamentally changed by perestroika. For the first time, Soviet scientists are being encouraged to seek research funds from outside their scientific institutes, and there are previously unknown freedoms to travel and work where they choose.

But there's another aspect of the new Soviet order that's becoming evident to Western scientists: the phenomenon of their Soviet colleagues delivering harsh public indictments of Soviet science at meetings in the West. Such was the case in New Orleans, where Maxim Frank-Kamenetskii, chairman of the department of genome expression in the Institute of Molecular Genetics in Moscow, blasted the reforms for failing to deliver the goods.

It is all very well to encourage independent funding, he said, but there are precious few sources of money, and "working conditions have deteriorated significantly." Shortages of laboratory supplies—a chronic problem—have become acute. And Frank-Kamenetskii maintains that the structural changes within the U.S.S.R. Academy of Sciences, including mandatory retirement ages and limits on the terms of institute directors, have not significantly altered the status quo. Older academicians, he says, are no longer "members" but they remain as "advisers," still effectively in control. "All this leads to cynicism and loss of confidence in the reforms," he says.

Frank-Kamenetskii is also not pleased with Soviet attempts to introduce peer review in the funding process, saying the money is still distributed based on political rather than scientific priorities. "The peer-review process is just tripe," he says. "They just ignore my evaluation," a sentiment U.S. researchers may feel empathy for.

More insidious, says Frank-Kamenetskii, is a Russian nationalistic movement that is also anti-semitic. Scientists are being told by other professionals that their ranks are "overpolluted" with Jews. This will only increase the brain drain as top scientists, many of them Jewish, will use their new freedom to leave the country.

But other Soviet scientists attending the meeting had a less gloomy outlook. Yuri V. Gulyaev, recently elected director of the Institute of Radio Engineering and Electronics, has high hopes for making his institute a model for the future. He has already succeeded in opening one of his institute's facilities outside Moscow to foreign visitors, and he has established a satellite body for institute members who have embarked on a commercial project.

But Frank-Kamenetskii believes a large hurdle still lies in the path of scientists in the Soviet Union. "I have no hope in the future of Soviet science unless the Communists are replaced by a democratic form of government," he says. Things have clearly come a long way, though. Even 2 years ago, such a statement would have been unthinkable from a Soviet citizen at a AAAS meeting.

■ **J.P.**