AAAS Meeting: Science Smorgasbord with Snow

Attendance at the AAAS annual meeting in Boston was at a record high for recent years, with 8700 people braving the half-finished Hynes Convention Center as well as wet snow and gale-force winds that closed Logan Airport on the first full day of the conference. Some hardy participants arrived by train. Others, including some of the speakers, were required to stay in Boston longer than they had planned. But perhaps the Soviets, of which there were 13 in a high-ranking delegation, were made to feel at home. The sessions on Soviet science were a major drawing card, but many other symposia, ranging from the science of protein folding to arms control, attracted large audiences. Some highlights follow.

Perestroika and Soviet Science

Peppering his lecture and casual conversations with references to such capitalist concepts as "market-driven systems" and "self-management," Konstantin V. Frolov, the vice president of the Soviet Academy of Sciences, outlined how the radical restructuring of Soviet society called "perestroika" is changing the way science works in the Soviet Union. The restructuring has touched scientists throughout the system, said Frolov. For the lowly graduate student toiling away at mathematics in the Soviet Union, perestroika means raising the student's stipend to 200 rubles a month. For the aging academician occupying a seat on the powerful Soviet Academy of Sciences, perestroika means forced retirement to make way for the younger generation.

"I have received a number of letters and notes asking me how perestroika is taking place in science," Frolov told a gathering at the AAAS meeting held in Boston 11 to 15 February. "The essence of the economic reform that is taking place in our country is to move from a centralized, administrated, command-type of economy to a democratic, economically or market-driven system and to find the optimal balance between centralization and self-management. The Soviet Academy of Sciences is part of that process."

Under the banner of perestroika, Frolov spoke of greater recognition of intellectual rights, of encouraging creativity, of strengthening the democratic base at the various research institutes, and of decentralizing scientific research in a country where science has long been hobbled by a heavy-handed, centralized bureaucracy.

In practical terms, Frolov said that perestroika means that more scientists will be able to pursue experiments that fall outside the interests of the directors of their institutes. More trips and exchanges with Western scientists will be permitted. Frolov also mentioned the creation of eight basic research laboratories to encourage greater cooperation between Soviet scientists in academia and industry, an admitted "weak side" of Soviet research structure. Two of the laboratories will be located outside the usual nexus of Leningrad and Moscow. One laboratory will be in the Ural Mountains, another in Vladivostok in the Far East.

Frolov made his remarks as leader of a high-ranking delegation of 13 members of the Soviet Academy of Sciences, each of them directors of institutes or leaders of large research programs. Though the Soviets have often been invited to the AAAS meeting, this marked the first time that such a powerful contingent attended. Frolov attributed the thaw to the recent summit meeting between President Reagan and General Secretary Gorbachev.

The Soviets' attendance was clearly a success. They impressed the gathering with their skill at English and their candor. Weaknesses in the Soviet system were not only alluded to, but discussed openly. Even jokes were told. Indeed, as the Soviet delegation moved down the corridors of the conference hotel, their progress was often slowed to a crawl as participants stood waiting for a chance to shake hands and ask a few questions.

The Soviets lectured on both the administration of science and current research directions. Some highlights:

Yuri A. Osipian, director of the Institute for Solid State Physics, said his country is heavily involved in computer technology for industrial automation and military technology. But he conceded there was a lack of computers in the Soviet Union. Said Osipian: "Our country has a highly developed computer science but no computers. Taiwan has no computer science but plenty of computers." The Soviets would clearly like to have access to American computers, particularly personal computers and the large supercomputing systems which the United States will not sell to the Soviets. "But sometimes it is a blessing. If you have less science equipment you have more time to think," said Osipian.

The Soviet space program is continuing to outrace the American effort. Albert A. Galeyev, director of the Space Research Institute, recounted the success of the Vega spacecraft which encountered Halley's Comet and outlined the Soviet mission to the Martian moon of Phobos, which is scheduled to be launched this July. The spacecraft will fly by Phobos at an altitude of 30 to 80 meters, for the first time using laser and ion mass spectrometry to measure the composition of the tiny natural satellite.

The Soviets said they will continue to increase their country's reliance on nuclear energy, raising the contribution made by

Soviets meet the press. *Although Soviet scientists have been invited to previous AAAS meetings, this was the first time such a powerful delegation attended.*

nuclear power from 11% in 1985 to 33% by the year 2000. Said Frolov: "We endured the tragic experience of Chernobyl and right now we are working on improving safety, reliability, and efficiency of nuclear power stations and in particular are developing a new generation of nuclear power reactors." Frolov also stressed that his country is committed to fusion research, and will continue to participate on a joint U.S., Soviet, and European project on a fusion test reactor, for which the first technical sessions are scheduled to begin this April.

In other areas, the Soviets discussed ongoing research in topics ranging from the transmission of ultrahigh voltage electricity to their fledgling biotechnology industry. Finally, Frolov said that one area where American and Soviet scientists should collaborate is the work of arms control and verification. "For the betterment of science and for prosperity on earth," said Frolov. That remark got a standing ovation. ■ **W.B.**

Monsanto Marker Shows Promise in Field Test

Field testing points to the success of a marker system for tracking and evaluating the effectiveness of microorganisms that have been genetically engineered for specific applications in agriculture. Researchers at Monsanto Company and Clemson University say the marker, which is based on two *Escherichia coli* genes known as *lacZ* and *lacY*, is proving to be an extremely sensitive mechanism for distinguishing between strains of the root colonizing bacterium *Pseudomonas fluorescens*.

An 18-month field test of the marker was initiated on 2 November in a small plot of wheat at Clemson's Blackville, South Carolina, research station. Funded by Monsanto, the experiment is being conducted to determine whether genetically modified organisms can be monitored adequately in the open. So far, the *lacZY* marker has been shown to be genetically stable, according to Clemson microbiologist Ellis Kline, who presented the results at a AAAS symposium on microbial ecology.

Pseudomonas fluorescens strains, which colonize the root systems of many plants, are viewed as potential vehicles for delivering growth promoters, pesticides, or fungicides to crops. But adequate evaluation of the effectiveness of genetically engineered bacteria requires better tracking tools. "What we've seen indicates that this is feasible," says David Drahos, group leader of Monsanto's plant microbiology department. Monsanto researchers say that the modified strain of *P. fluorescens* does not appear to compete with native populations and shows little migration beyond the point of introduction. ■ **M.C.**

Baltimore Attacks "Professional Guardians of the Status Quo"

David Baltimore, director of the Whitehead Institute for Biomedical Research at MIT, opened the AAAS meeting on 11 February with a fiery blast against the "powerful retrograde forces" he sees at work in society, forces that could obscure the "glories of new knowledge" remaining to be discovered. The problem, he said, is created by two armies of ignorance made up of "those who fear and distrust science and those who wish to pervert science to their own ends."

Baltimore noted that "many of us have had to spend long hours fighting for the right to continue doing research," and he listed some of the types who stand in the way, including:

■ "Professional guardians of the status quo" who aim to "stop all recombinant DNA research" and who have pitted researchers like himself against "those who see only hazards in the new technology"—presumably a gibe at Jeremy Rifkin, an activist who has been generally critical of applications of biotechnology.

■ Animal rightists, who "threaten the whole enterprise of modern biology, putting animal rights ahead of the human right to optimum health."

■ Politicians and citizens who are unable or unwilling to consider the good scientific rationale that justifies the field testing of altered bacteria.

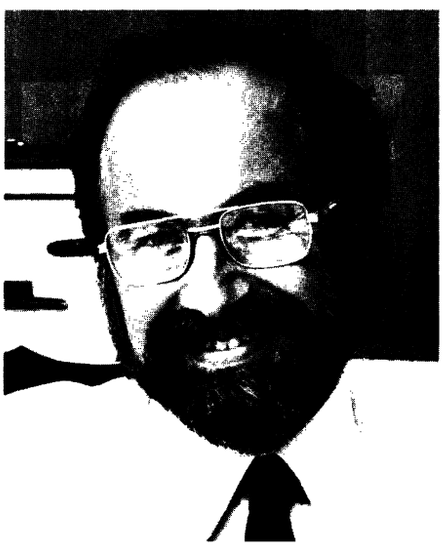
■ "Ignorance, superstition, and fear at their most nefarious," embodied in the creation science movement, which "denies the basic fundament of all biological science, the concept of evolution."

■ The crude "anti-elitism" in Congress that favors pork-barrel funding of projects and attacks the peer-review system, a trend that "runs counter to the understanding that forefront science is a difficult enterprise in which only a few excel."

Baltimore also took the federal science establishment to task for one case of neglect (failing to recognize the gravity of the AIDS epidemic early on) and one case of hyperactivity (putting too much emphasis on mapping the human genome). He called the genome project a "ploy to raise money, a project justified by its public relations value not its scientific value." It would be best to entrust this whole task to the National Institutes of Health (NIH), Baltimore said, because NIH is "well positioned to be certain that the effort is integrated with the rest of modern biology, not a moon shot run under separate auspices."

By contrast, he charged that the U.S. attack on AIDS has been "too timid." The Whitehead Institute has begun to solicit funds for a new program of AIDS-related research.

In closing, Baltimore denounced the Administration's heavy emphasis on military applications, particularly for "diverting billions of dollars to a defensive system [the Strategic Defense Initiative] that is ridiculed by most of the knowledgeable scientific community." He considers the program a "cruel hoax," and its endorsement by the President's science office, a "black mark for science." ■ **E.M.**



David Baltimore. *A fiery opening blast.*

China and the Bomb

China's nuclear stance is a simple one: The Chinese want to possess enough weapons to be taken seriously, but not enough to break the bank, said Di Hua, a director of the China International Trade and investment Corporation in Beijing, who spoke at a AAAS symposium on China and arms control. "China needs to have a limited but strategic nuclear arsenal, a shield to keep the more aggressive of the two superpowers from attempting global hegemony," said Hua.

At this, the Chinese have succeeded, reported Richard Fieldhouse of the Stockholm International Peace Research Institute. According to public documents unearthed by Fieldhouse, China has between