that gives Academy nominees almost all the seats allocated to organizations representing scientists as "very undemocratic."

Among those who failed to have their nominations accepted was historian Dmitri Likhachev, who is also a member of a group within the Writers' Union thought to have persuaded the union's board to pass the resolution highly critical of the Academy's record on environmental issues.

The resolution lists various events and issues on which it says the Academy has failed to take a firm stand. These range from the (now shelved) project for diverting part of the flow of northern rivers into the Volga, to its silence on "the losses in quantity and quality of forests and land as a result of so-called land improvements." The resolution also cites the Academy's failure to publish "an objective and complete picture" of the human and environmental damage caused by the Chernobyl accident.

Similar criticisms of the Academy's stance on environmental issues—despite the increasing priority being given to environmental research—was voiced at a meeting in December held jointly with the Academy of Agricultural Sciences to discuss plans to construct a canal between the Volga and Chogray rivers. One of the project's opponents, Y. Pastukhova of the All-Union Scientific Research Unit for the Protection of Nature, later criticized Academy president Marchuk, who presided over the meeting, for saying that only scientific problems pertaining to the canal project—and not wider questions about the project's general desirability—could be discussed.

This time, the criticism appears to have had an effect. Last week, it was announced by the USSR State Planning and State Construction Committee that work on the canal will be stopped. The Academy apparently convinced the Ministry of Land Reclamation and Water Resources to take seriously scientists' fears that the construction of the canal would result in an "ecological catastrophe" in the Caspian region.

Marchuk is said to be coming under increasing pressure from Soviet leaders to make sure that criticism of the Academy and its activities does not get out of hand. A meeting of the Academy's Presidium was due to be held on 7 February to discuss how it should respond to last week's demonstration, and in particular to a resolution handed in by the protesters asking for the results of the selection procedure to be overturned. Some Western observers were speculating that a new procedure for approving candidates for the congress elections would be adopted at this meeting, and that last month's selection might be rerun.

■ **DAVID DICKSON**

U.S. Students Flunk Math, Science

There is more bad news on the science literacy front. One week after the National Research Council released a report calling for a complete overhaul of U.S. math education to counteract poor math proficiency (*Science*, 3 February p. 597), a new international study shows that U.S. 13-year-olds are at or near the bottom of the pack when it comes to math and science achievement.

American students placed dead last in math achievement, behind four foreign countries and four Canadian provinces. They fared little better in science achievement, ranking among the bottom four groups studied.

But what is bad news for the United States is good news for South Korea. In math, students in all the countries sampled did well at simple addition and subtraction. But while 95% of Koreans could solve simple one-step problems, only 78% of American students could do so. When it came to two-step problems such as calculating an average, the gap widened to 78% versus 40%. And the differential in understanding concepts was even greater; 40% of Koreans, but only 9% of Americans showed an understanding of basic principles of measurement and geometry.

Science scores show a similar pattern. All students knew basic everyday science facts, but Koreans excelled in applying simple scientific principles (95% versus 78%), analyzing simple data (72% versus 35%), and designing experiments and interpreting data (31% versus 7%).

The study, conducted by the Educational Testing Service with funding from the U.S. Department of Education and the National Science Foundation, included 24,000 students in the United States, the United Kingdom, Spain, Ireland, Korea, and four provinces of Canada—British Columbia, New Brunswick, Ontario, and Quebec. Tests were translated from English into native languages. In the Canadian populations, French- and English-speaking students were tested separately.

Overall, in math achievement the groups divided into four tiers, with Korea all by itself at the top. The second tier was filled by British Columbia, English-speaking New Brunswick, and the French- and English-speaking students of Quebec. The third tier held Spain, the United Kingdom, and Ireland, the French-speaking students of New Brunswick, and the English-speaking group of Ontario. The last tier held the United States and the French-speaking students of Ontario.

In science achievement there were three tiers, with British Columbia and Korea at the top. The United States, Ireland, and the French-speaking populations of Ontario and New Brunswick were in the bottom tier.

The study did not examine reasons for the differences, but does offer some interesting possibilities. Some of the groups studied—Korea and New Brunswick, for example—feature centralized control over curriculum, a system that routinely results in high achievement on standardized tests. That system has not proved workable in the United States, where states and local school districts set curricula.

South Korea, too, is riding the crest of a wave of high-tech industrialization, and science is promoted both at home and in school. Adult illiteracy is almost unknown in Korea, and parents place great emphasis on education.

American students were weakest in those skill areas in both math and science that most often predict future careers in those fields, the report says. "It's a pretty accurate picture of what the 23-year-olds of 1999 will be able to do," Archie Lapointe, author of the study for ETS, said at a news conference.

The study has elicited the expected howls of dismay from educators.

"It's obvious that if this is not corrected, the Buck Rogers of the 1990s will be living in Seoul, not Chattanooga, Los Angeles, or Chicago," said Lamar Alexander, president of the University of Tennessee and a former governor of the state.

"Comparisons are odious, and few comparisons are more odious than the ones embodied in this little book," said Bassam Z. Shakhashiri, assistant director for science and engineering education at NSF. "The lack of preparation for further education and future employment that these American teenagers demonstrated is nothing short of frightening."

Albert Shanker, of the American Federation of Teachers, called the report "devastating."

Talks are under way for another international comparison, possibly including the Soviet Union, in 1990.

■ **GREGORY BYRNE**