lobbied hard for tax relief, saying that high taxes have driven Canadian high-tech talent across the 49th parallel. Chrétien has resisted that argument, declaring just last month that such flight is "a myth." Indeed, demographers say that Canada actually enjoys a favorable intellectual trade balance, and that the outflow to the United States in particular has shrunk by one-third since the 1950s. But last week, Chrétien appeared to acknowledge the existence of a brain drain without endorsing the business community's solution. Rather than lower taxes, he reasoned, why not give universities the wherewithal to attract the necessary talent to compete in a global market. "Our goal is for Canada to be known around the world as the place to be," Chrétien told Parliament. "That's particularly [true] at a time when U.S. universities benefit from both permanent endowments and the generosity of private foundations out of all proportion to those of our universities."

The new investment—400 new research chairs in each of the next 3 years and an additional 800 "as soon as possible thereafter"—couldn't have come at a more critical moment for universities, science administrators say. "It's like having the capacity to build a hockey team with several [Wayne] Gretzkys on it," says Social Sciences and Humanities Research Council president Marc Renaud. "It gives [universities] the feeling that they can grow and compete with the Americans." Medical Research Council president Henry Friesen called it "a stunning announcement in positioning Canada's economy to compete on a world stage."

Each research chair will be awarded for 5 to 7 years and will be renewable. The allocation will be based on an institution's success in obtaining competitive research grants. To prevent major research universities from gobbling up all the funds, however, small institutions will be guaranteed at least one chair. The biomedical and natural sciences are each projected to receive a 40% share, while the social sciences have been promised 20%.

Two types of chairs will be created. The first, intended to liberate senior scientists from teaching duties, will provide roughly $140,000 a year for "star researchers with a proven track record." Universities can spend the money to hire a new investigator, to top up an existing salary, or to absorb costs associated with replacing the star in the classroom. They may also funnel it into indirect costs such as lab operations and utilities. The second category, which provides about $70,000 for so-called "rising stars," is intended to attract younger faculty to aging departments.

Whether the new monies will actually stem the brain drain is not clear, however. In fact, some argue that the problem may not even exist. Only 1.5% of postsecondary graduates in 1995 went to the United States for some period of time, says Statistics Canada director of education statistics Scott Murray, and only one in eight of them held a Ph.D. Overall, Canada is a net beneficiary of university graduates, gaining 33,000 university-educated immigrants annually while losing 8500 to the States. Immigrants are also three times more likely to hold a master's, doctoral, or medical degree than the Canadian-born population. "All of us know some people who've left," says Canadian Association of University Teachers executive director Jim Turk, noting the impact of budget cuts on university staffing. "But the plural of anecdote is not data. At most you can argue there's a trickle, primarily in the area of health care."

But there's no doubt that Canada has lost some exceptional talent over the years. For example, seven Canadians who moved south have subsequently collected Nobels. One of them, Stanford physicist Richard Taylor—an Alberta native who came to the United States in the 1950s for graduate school and never returned to work in Canada—takes issue with the notion that his career path is a "myth." Taylor, who shared the 1990 Nobel prize for electron scattering experiments that documented the existence of quarks, says the factors underlying the exodus are complex. They include insufficient spending on research, a relative lack of major research facilities, an unwillingness by Canadian industry to invest in research, and a culture that disdains elitism and risk. "It's not greed that drives people to the United States, it's ambition," he says. If the U.S.–based Canadian Nobelists had stayed in Canada, he says, "few of them would have won the prize."

Although he welcomes the additional chairs, Taylor says they will be insufficient without a change of attitude. "It's very hard for a government, especially a Canadian government, to be elitist," he says. "But that is what you should be if you want to do a good job." –WAYNE KONDRO

NUCLEAR SAFETY

## Secret of Soviet-Era Nuclear Blast Revealed

**MOSCOW**—For the past 3 decades, rumors have circulated here that in the early 1970s an accident at the Kurchatov Institute of Atomic Energy, in a residential suburb of Moscow, released a cloud of gas that drifted over the city, exposing the population to potentially harmful radiation. Late last month at a nuclear safety conference in France, a senior Kurchatov researcher discussed these events in public for the first time: There were two blasts at the institute in the early 1970s, he said, but although two technicians were killed, as far as Kurchatov scientists could tell, no radionuclides were released over the

## ScienceScope

**Double Vision?** India now has two science ministers. Last week Prime Minister Atal Bihari Vajpayee retained physicist Murli Manohar Joshi, left, as cabinet minister overseeing the civilian science portfolios and education; the space and atomic energy agencies still report directly to Vajpayee. At the same time, the PM appointed lawyer Santosh Kumar Gangwar, right, to the new junior post of minister of state for science and technology.

Joshi says the ministry plans a 2-day brainstorming session later this year to prepare an S&T agenda. The plan may tilt toward applied projects: Gangwar, who will tend to the science portfolio on a daily basis, told *Science* that research institutions must work harder on problems that address national needs.

**Dead End** Kennewick Man, the 9000-plus-year-old remains found on the banks of Washington's Columbia River 3 years ago, does not appear to be related to modern-day American Indians or Europeans. The skeleton's analysis, released last week by a government panel, weakens Native American claims to the remains, which are at the center of a court case brought by researchers who have been denied access to them. Kennewick Man was probably part of "an early migration of Asian Pacific peoples into the Americas who left no descendants," says panel member Jerome Rose of the University of Arkansas, Fayetteville.

The government, which last month finally sent out some bone samples for more exact radiocarbon dating, must now settle the question of Kennewick's "cultural affiliation." That's going to be a tough task, because the only cultural evidence is a broken basalt projectile point embedded in the pelvis. And if officials want DNA tests to shed more light on Kennewick's lineage, they'll have to act fast: A court order requires a custody decision by March.

**Polygraph Retreat** Protests from scientists at the nation's three nuclear weapons research labs have apparently convinced Energy Secretary Bill Richardson to scale back controversial plans to polygraph some 5000 employees in a bid to boost security (*Science*, 3 September, p. 1469). But protest leaders are withholding comment until they see the new rules, which are due out on 1 November and reportedly cover fewer than 1000 people.

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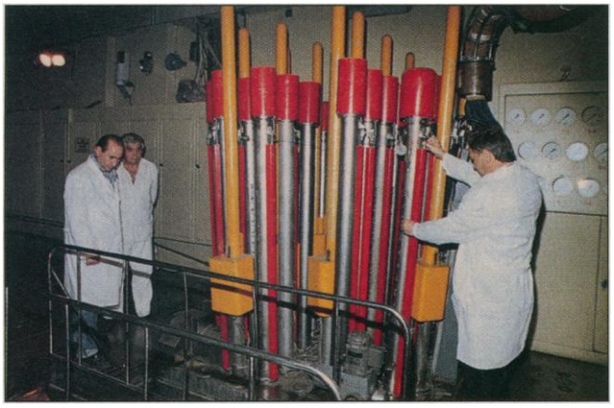
city. According to Stanford University historian David Holloway, author of the book *Stalin and the Bomb*, "Secrecy was such in the 1970s that it would have been covered up."

The Kurchatov Institute was at the heart of the Soviet Union's atomic weapons program in the 1940s, but it moved over to civilian research in the 1950s when weapons research was transferred to the secret nuclear cities in eastern Russia. Today, the Kurchatov, which is now one of Russia's State Research Centers, is home to seven research reactors. Dmitry Parfanovich, a leading researcher at the Kurchatov, told the International Conference on Nuclear Criticality Safety in Versailles that the most serious blast occurred on 26 May 1971. At the time, Parfanovich was working in the research area close to one of the institute's critical nuclear assemblies—a basic feature of a nuclear reactor. "It all happened because the structure of the critical assembly was very fragile," Parfanovich told *Science*.



**Secret's out.** Researchers working on a nuclear safety installation at the Kurchatov Institute.

At about 4:00 p.m., experiments at this reactor had been completed and researchers were in the process of shutting it down. This involved draining the assembly of water, which was used as a moderator. Standard procedure required the water to be drained slowly and carefully, but on that day, Parfanovich recalls, the workers were in a hurry and they used a large emergency drain at the bottom of the tank. The rapid removal of the water moderator caused the structure to heat up, creating excess pressure that buckled the base of the reactor. As a result, uranium rods came out of their sockets and dropped out of the bottom of the assembly onto the floor below, where they created a critical mass. There was a flash of radiation, then the rods melted and changed their configuration, so the reaction stopped again.

Although the blast lasted only milliseconds, Parfanovich said a technician standing nearby received a dose of direct radiation amounting to 6000 Roentgen. He died the next day of a heart attack. A researcher received more than 2000 roentgens and died 2 weeks later. Another two researchers received 800 to 900 roentgens and were saved through extensive medical treatment, but their health suffered as a result. Other staff were protected by a concrete shield and received insignificant doses.

All personnel working in the building were evacuated, and routine radiation checks revealed that some had radioactive iodine on their clothing. Vladimir Asmolov, head of the Institute for the Control of the Safe Use of Nuclear Energy (a part of the Kurchatov center), recalls that some young researchers who had contaminated clothes deliberately evaded the security and simply waited for the level of radioactivity to go down. They went drinking in an apple orchard on the grounds of the institute, which had been planted by its founder, Igor Kurchatov, "father" of the Soviet bomb. (Kurchatov liked to demonstrate the safety of his institute by eating apples from the trees.) Despite the rumors of radioactive clouds floating across downtown Moscow, Parfanovich said no emissions were traced outside the research area.

The whole incident was kept secret, even from researchers in other branches of the institute. Most knew that an explosion had taken place but had no idea of its severity. Similarly sketchy details had leaked out of another weaker blast which had happened about 3 months earlier. In this case researchers were unaware there was anything wrong with the reactor until they noticed a blue light illuminating the ceiling. Parfanovich reported that two researchers received a dose of about 1000 roentgens, and one of them later had his feet amputated.

Parfanovich told the Paris meeting that there were a total of five such blasts in research centers during the Soviet era. Asmolov thinks that the atomic research institutes and the nuclear power industry that grew out of them nevertheless had a good safety record, but that standards are now slipping. "Greater openness now about the past serves as a signal that they are trying to address safety issues seriously today," says Holloway. However, safety concerns now keep all the research reactors at the Kurchatov idle, and even the director of the Institute, Evgeny Velikhov, favors moving them outside Moscow.

–VLADIMIR POKROVSKY

Vladimir Pokrovsky is a writer in Moscow. Additional reporting by Richard Stone.

VIROLOGY

## On the Track of Ebola's Hideout?

One of the many unsolved riddles about the Ebola virus is where the deadly organism hides in between outbreaks in humans. Now, for the first time, virologists may have found traces of the virus's genetic material in small ground-dwelling mammals near areas of previous epidemics. Experts welcome the findings, announced last week, but point out that it is still too early to celebrate the discovery of the Ebola reservoir.

Ebola, which first surfaced in 1976 in Congo and Sudan, causes vomiting, diarrhea, and copious internal and external bleeding. The virus kills up to 85% of its victims, and there is no known treatment. Recent epidemics have spurred an intensive search for an animal host that might support the virus, but so far to no avail. Although many species can be infected experimentally with Ebola, those captured in the wild have not had detectable levels of the virus. Some researchers speculate that the animal reservoir must be in a secluded area—deep in a rain forest, perhaps, or high in a tree canopy—whose animals have been hard to sample.

Unconvinced that local animals are spared by Ebola, Marc Colyn of the University of Rennes in France looked at animals from a variety of habitats near previous outbreaks of the disease. His team screened 242 animals, including several species of rodents, shrews, and bats, that had been captured in the Central African Republic. The researchers detected no live virus or viral antigens, but when they used a more sensitive screen—the polymerase chain reaction—they managed to pull fragments of the Ebola genome from seven animals: one shrew and six rodents from three different species. Then when they examined spleen tissue slices from these animals under the electron microscope, they saw tubular structures that looked exactly like the inner core of Ebola virus particles. "These structures are most likely defective [virus] particles

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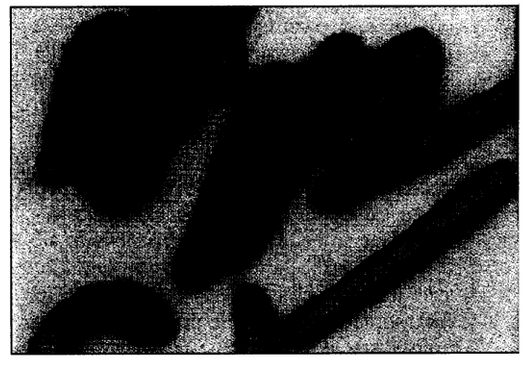

**Deadly agent.** Ebola virus.