ings that were only concluded on 23 January.

By the time the directive was put to the vote last week, however, a clutch of new MEPs were in place following elections last year. They hadn't been exposed to years of lobbying from the biotech industry, and homed in on issues that hadn't been sticking points in earlier drafts of the directive. In particular, some of the new parliamentarians opposed the directive because it would not have explicitly banned human germline gene therapy, which introduces permanent, inheritable traits into genes. And, in a surprise move, the European socialist group resolved to vote against the directive, one of their members saying that patents on living things would inhibit research in the field.

Biotech industrialists seem untroubled by the defeat. Ron James, managing director of PPL Therapeutics in Edinburgh, U.K., which has patent applications pending in the United States and Europe on transgenic sheep that produce drugs in their milk, believes the final directive would have been little improvement on the EPC. "Clarity wouldn't have occurred. ... Many of the clauses were open to different interpretations." And industry leaders are now adopting a wait-and-see attitude. "We'll see what comes out of EPO case law, and I think industry's happy to abide by that," says Nick Scott-Ram, chair of the intellectual-property advisory committee of the U.K. BioIndustry Association.

Biotech companies are encouraged because since they first began pushing for the directive, the EPO has granted one patent for a transgenic animal: Harvard University's "oncomouse." And Christian Gugerell, a director of the EPO, predicts further applications on transgenic animals "in the pipeline ... will be granted," including James' sheep, because they satisfy the necessary criteria of novelty, inventiveness, and utility.

Researchers are more worried. The directive made a clear distinction in the case of DNA between a "discovery," which is not patentable, and an "invention," which is. Thus a strand of complementary DNA, for example, with no other defined use than "expected" applications such as a probe or primer, would have been declared unpatentable. Without the directive, that distinction remains untested. Cells, complete genes, or proteins would not have been patentable under the directive unless they were part of an invention—which corresponds to the situation that exists under the EPC.

Green Party MEPs and various lobby groups such as Greenpeace and animal-rights organizations will continue to try to stop the patenting of animals by challenging individual cases. The British Union for the Abolition of Vivisection, for example, is challenging the oncomouse patent in a case to be heard at the EPO in November. In the absence of the directive, the outcome of such cases will provide the basis for European biotech patent law.

–Claire O'Brien

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CANADIAN R&D

Science Budget Takes 15% Whack

TORONTO—The Canadian government last week unveiled a draconian budget that will slash research spending by roughly 15% in the next 3 years. The cuts—the first significant across-the-board reductions to Canadian science in more than a decade—are part of a campaign to shrink government and reduce a budget deficit that, in proportion to its economy, exceeds that of the United States. The government also made it clear that it will step up pressure on research agencies and institutions to show the economic value of the work they are funding.

"We will be putting government activities on a commercial basis wherever that is practical and productive," said Finance Minister Paul Martin last week in presenting the government's budget to the House of Commons. "In the future, our science and technology efforts will be concentrated more strategically on activities that foster innovation, rapid commercialization, and value-added production."

Approval of the government's budget for the 1995–96 fiscal year starting 1 April is a foregone conclusion, given the ruling Liberal Party's parliamentary majority. It will wipe out a scheduled 1.5% increase in the budgets of all three university granting councils—the Natural Sciences and Engineering Research Council, the Social Sciences and Humanities Research Council, and the Medical Research Council. Instead, they will see their funding drop by 12% to 13% over the next 3 years (see table).

Even harder hit is the Canadian Space Agency (CSA). Its base budget will drop by 15% in the next 3 years, with spending increasingly directed toward private-sector partnerships and joint ventures in Earth observation, space science, and technology. One third of the cut will come out of work on the sophisticated robotic arm that is Canada's main contribution to the international space station; the remainder will come from reductions in the agency's infrastructure. Daniel Goldin, head of the U.S. National Aeronautics and Space Administration, told *Science* that CSA chief Mac Evans last week assured him the reductions should not affect Canada's participation in the space station effort.

RESEARCH CUTS IN SELECTED R&D AGENCIES
(millions of Canadian dollars)

Organization	Current budget	Proposed for '97–98	% change
Canadian Space Agency	174*	148	–15%
Nat'l Research Council	449	372	–17%
Natural Sci. & Engin. Res. Coun.	494	428	–13%
Soc. Sci. & Humanities Res. Coun.	101	89	–12%
Medical Research Council	266	235	–12%
Agriculture Ministry	269	239	–11%

*Base programs; excludes Radarsat SOURCE: CANADIAN GOVERNMENT MINISTRIES
One Canadian dollar = $0.71 U.S.

The National Research Council (NRC), a network of government laboratories, will have to trim spending by 17% by 1997–98, including a $30 million cut in the coming year. "I'm disappointed. We've certainly taken a hit," says NRC President Arthur Carty. "With limited resources you just can't afford to spread yourself too thin."

While the impact of the new budget on specific programs remains unclear, the cuts have focused attention on the way Canada funds science. Current total R&D expenditures of $4.1 billion are spread across 18 departments, and a recent report by the auditor-general called the distribution "more incidental than the result of a well-formulated strategy." In response, the government launched a review of federal spending on science and technology that is expected to be finished in June, and Bill Milliken, a spokesperson for Industry Canada, says the exercise has benefited from the fact that "a shortage of funds tends to focus things."

As bad as the cuts are for science, the government's new budget is even worse news for other sectors. The $116 billion budget includes spending cuts of $9.2 billion over 2 years, as well as the elimination of 45,000 civil service jobs, about 15% of the government payroll.

–Douglas Powell

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