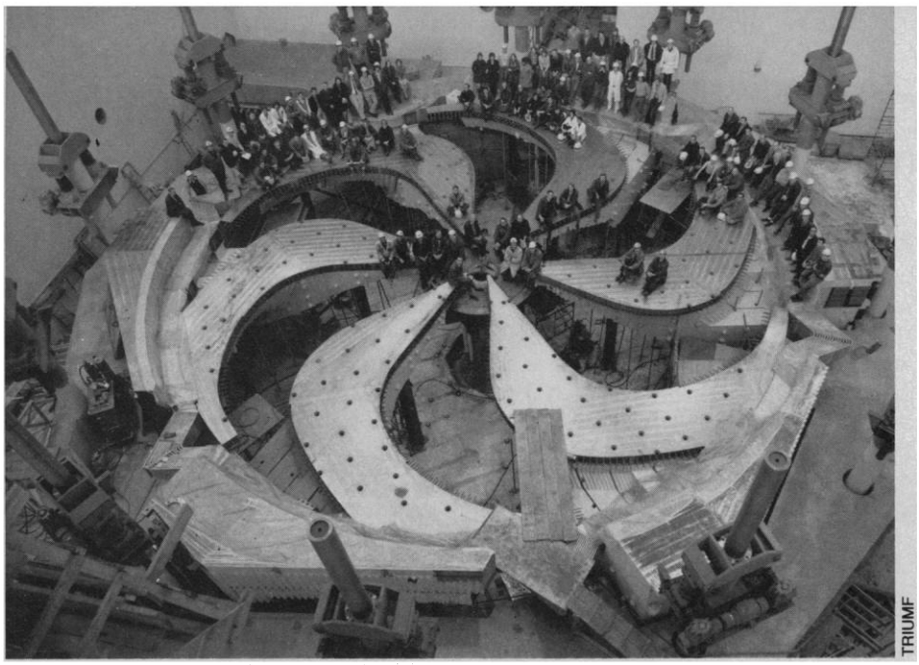

Making kaons. *TRIUMF's magnets will form the core of the new KAON Factory.*

Will Canada Build on Earlier TRIUMF?

The Canadian federal government is about to decide whether to enter the big leagues of particle physics

Waterloo, Ontario—"IT IS VERY RARE IN today's world that any country has the opportunity to take the leadership position in a major frontier area of science for a period of several decades. Canada has that opportunity right now." Those are not the words of a Canadian scientist or politician pitching a new program. They come from U.S. Presidential Science Adviser D. Allan Bromley. He was speaking about a plan now before the Canadian government to build a new accelerator adjacent to the world's largest cyclotron in Vancouver, British Columbia.

"[Canadian Science Minister] William Winegard made the point to me that he didn't think they could afford it," Bromley said in an interview with *Science* editors late last month. "I took the opposite tack, saying that I did not believe that Canada could afford not to do it."

Within the next week, the cabinet in Ottawa will decide whether or not the federal government can afford its share of the $709-million construction cost of the project. Despite Bromley's enthusiasm, the new accelerator—dubbed the KAON Factory for the subatomic particles it will produce—has not been popular with Canadian scientists. They worry that it will drain resources away from granting councils that support the majority of investigator-initiated science in Canada. But supporters argue that if the money doesn't go to the KAON Factory, there's no guarantee it will find its way to another science project.

It is not just Canadian science that is hanging on the cabinet's decision. Germany, Japan, and the United States have shelved similar proposals for kaon factories in favor of a single facility at the Vancouver site. Indeed, the U.S. Department of Energy has already committed $100 million to the project and Canadian officials estimate another $100 million can be raised from other foreign partners. This is in addition to the $236 million that British Columbia Premier Bill Vander Zalm announced last September his government was committing to the project. The Canadian government is being asked to come up with about one-third of the total construction and operating costs.

The plan is for the KAON Factory to use the existing cyclotron accelerator at the Tri-University Meson Facility (TRIUMF), located on the campus of the University of British Columbia, as a front end to five new accelerator and accumulator rings that will boost the energy of protons to 30 GeV (billion electron volts). That's not a particularly high energy by modern accelerator standards—the U.S. Fermilab's Tevatron can boost protons to energies measured in the trillions of electron volts—but the KAON Factory will make up for it by the very high intensity of its beam. This will allow the facility to test the so-called Standard Model of particle physics with experiments on the short-lived "charm" and "strange" quarks, which are components of kaons and many of the other short-lived particles that will be produced at the KAON Factory.

There are many experiments that are crucial to understanding the standard model that would take 5 or 10 years to do on existing accelerators, says Bromley. "You could do them in hours or days on the KAON Factory simply because you have orders of magnitude more intense beams," he says.

By any standard the KAON Factory is "big science," but especially so by Canadian standards. For example, the annual budget of the largest granting council, the Natural Sciences and Engineering Research Council (NSERC), is just $420 million, slightly more than half the cost of building the KAON Factory. And then there are the annual operating costs, estimated at $65 million per year.

It is no wonder, then, that the proposal is causing nervousness in Canada's scientific community. In a letter to Prime Minister Brian Mulroney, Kevin Keough of Memorial University in Newfoundland and president of the Canadian Federation of Biological Sciences said the financing of the KAON Factory "could do irreparable harm to the future of Canadian science." A review of the proposal in 1986 by Canada's National Research Council and NSERC concluded that while the science was high quality, the project was simply too expensive, and should not be funded at the expense of other priorities such as the granting councils and the Canadian Space Agency. And a subcommittee of the Prime Minister's National Advisory Board on Science and Technology also rejected the KAON Factory in favor of a budget increase for the granting councils.

TRIUMF director Eric Vogt is equally adamant that the granting councils are "the highest national priority, bar none, and I include [the KAON Factory] in that." But Vogt and other supporters contend that the KAON Factory is clearly a unique national project and new funds should be found. "Let's get on with improving the abysmal funding we have for the granting councils," says Vogt, "but let's also say we have a vision for Canada in which big science projects of excellence can also go ahead."

Bromley agrees. "I think the Canadians would be making a terrible mistake if they do not fund this." ■ DOUGLAS POWELL

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