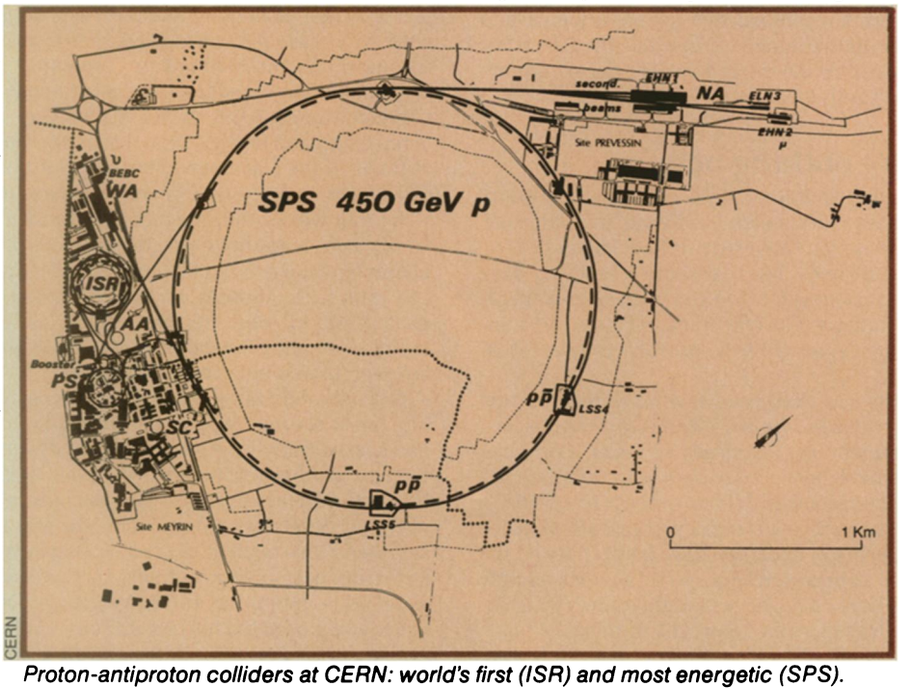
Super Physics-Politics Collider

About 10 years ago the progress of particle physics had reached a state where it seemed desirable to build an apparatus that would accelerate two beams of protons to about 400 billion electron-volts each (400 GeV) and collide them with each other. Eventually construction of such a project, called the Colliding Beam Accelerator (CBA) began at Brookhaven National Laboratory in Upton, N.Y. Work went slowly. Funds were slow in coming. There were serious problems with badly designed magnets. But it seemed too that there was a lack of push. From time to time the project seemed becalmed in a kind of Bermuda Triangle of physics.

Meanwhile the Europeans learned to manage beams of antiprotons, and they built an apparatus to collide them with protons. Successful experiments made it quite clear that this technique was more useful and was opening up new kinds of physics. It became painfully apparent that physics had passed the CBA by, although it took a couple of years to bring about an official acknowledgment. Last year amidst a good deal of pain for many people the CBA was canceled. The U.S. physics community cut its losses and prepared for its next big project, the Super Superconducting Collider (SSC).

The SSC would collide protons with antiprotons that have energies in the tens of trillions of electron-volts. It would be the grandest piece of physics apparatus yet, a real showpiece for the turn of the century, and a probe of God knows what in the intimate structure of matter. Many physicists are enthusiastic, and what seems different from recent years is that there is enthusiasm also in government circles — that is, if George A. Keyworth II, the president's science adviser, is representative. One hopes the SSC will not go the route of the CBA.

Keyworth came to Fermilab in Batavia, Ill., to help dedicate the Tevatron, now the world's most energetic accelerator of protons, and gave a speech that ranged over several topics but can fairly be called in part cheerleading for the SSC. Since the Department of Energy showed serious interest in the SSC last summer, U.S. physicists have not been idle. Several groups have been working on preliminary designs, and these have now been handed to a central committee for evaluation. For people who can take four or five years — for very good reason — to design and mount a single experiment, this is fast footwork, but it's not enough for Keyworth.



Proton-antiproton colliders at CERN: world's first (ISR) and most energetic (SPS).

"In all candor I don't think the physics community yet appreciates the magnitude of the job they have before them," he says. "It's been the better part of a year now since we achieved unification behind SSC, but we should really question whether that time has been used wisely."

In the words of one physicist who heard the speech: "Keyworth told us to get off of the pot."

There is a design to be achieved, and there is lobbying to be done, and not only in Congress. Says Keyworth, "What are you going to answer when, say, the biotechnologists or materials scientists ask you why physics of this magnitude deserves their support?" Events in Great Britain right now give a disturbing counterpoint to that question. Britain was one of the founders of the European international laboratory CERN. Now with CERN piling triumph on triumph, Britain is dithering about withdrawing. Part of this seems to be the gradual failure of national nerve evident in recent decades, but some of it is explicitly the question of what to tell the biotechnologists and other interested parties. One might tell them that quantum chromodynamics may have something to do with the genetic code.

Like CERN, the SSC will be in some respects an international endeavor. "I recently visited Japan expressly for the purpose of inviting their interest at this earliest stage of our planning," Keyworth says. He also hopes to interest "our European partners." Might an observer suggest also looking across the border to the north? A proposal for a Canadian contribution to Fermilab fell away because Canadians were concerned that their effort would be invisible. Well, CERN straddles an international border, why not the SSC? Interested parties say the SSC will have to be near a metropolitan city with good educational facilities. Montreal might qualify, and it's fun to visit.

Siting the SSC will be one colossal political problem. Already bureaucrats have been seen to fly into rages when a prospective site is even hinted at. Yet it is difficult to plan such a thing without an idea of where to put it. Keyworth says, "There's going to be only one supercollider in the world. And wherever that turns out to be will become the international center for much of experimental physics, a place that draws the world's best minds to it." That place should be picked for its cultural and intellectual preeminence, not for the sake of provincial politics.

As Keyworth puts it, "... persuasive arguments will *have* to be made." He is in a good position to put them to the government. If he can play the role of John Riggins, perhaps the physics-political superbowl can be won. —*Dietrick E. Thomsen*