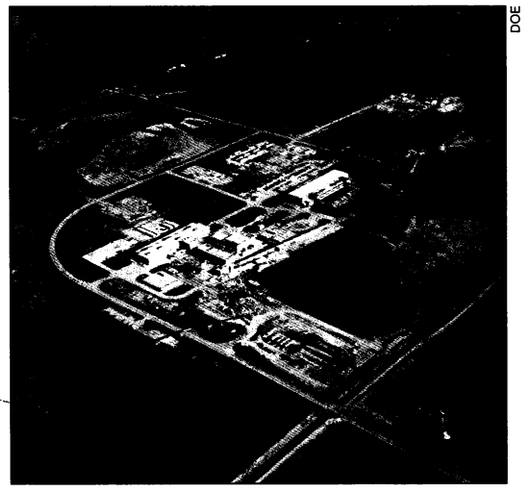
Yale theorist Mike Zeller, the SSC was a surer bet because existing theories actually predict that something profound will occur in the energy range it would have achieved. "We know the Standard Model is going to fail at high energies," he says. The SSC's high-energy collisions would have recreated conditions that prevailed in the universe's infancy, moments after the Big Bang, when today's diverse particles and forces were "unified" in single entities.

By crossing the line into this simpler era, says Zeller, the SSC could have turned up clues to the "symmetry breaking" that transformed the cooling universe from simple to complex, for example by endowing particles with an array of different masses. The most popular theory predicts that the symmetry breaking will manifest itself in a particle called Higgs, named after British theorist Peter Higgs. "But if there's no Higgs there will be something else that emulates the Higgs," says Zeller. "What takes us by the gut is that with no SSC we can't get there to see it." Theorists were less confident, but just as eager, about other possible glimpses beyond the Standard Model. One theoretical extension known as supersymmetry, for example, predicts a whole slew of new particles that might have been within reach of the SSC.



DOE

Ground zero. The SSC laboratory and construction site, where tunneling had already proceeded for 14 miles.

Now all those hopes have to be pinned on Europe's LHC, a proton-antiproton accelerator that would be built in CERN's existing 27-kilometer tunnel and could be up and running in 2002. The LHC's smaller size leaves it scientifically disadvantaged, limiting it to energies only one-third as high as the SSC would have reached. It will reveal new phenomena only if, as physicists say, nature is kind. One physicist compares hunting for the Higgs particle with the LHC to searching for a watch by combing only one-third of the room. Still, it's better than nothing, says Argonne National Laboratory physicist Tom Kirk, who moved to Waxahachie to work on the SSC: "LHC is the only viable back-stop for attacking the Higgs problem."

Machine dreams

CERN physicists are already building prototypes for the magnets that will accelerate the particles around the ring and are starting work on the two detectors. And although CERN's member countries will not decide for certain whether to proceed with the LHC until 1994, proponents are optimistic. Because it is being built in an existing tunnel, the LHC will cost only about one-tenth as much as the SSC. And CERN's incoming director-general, Christopher Llewellyn Smith, isn't worried that the U.S. Congress's actions will set an example for CERN's members. "I don't think [the SSC's demise] will have much effect" on the decision, he says.

Even if he's right, however, the LHC will provide only limited opportunities for U.S. physicists. A few Americans have already joined LHC collaborations, but to get a stake in running the lab and more opportunities for scientists, some U.S. physicists want to join the CERN itself, which would require an annual fee of about $200 million. "I'm willing to get down on my hands and knees and grovel," says Fermilab physicist and Nobel laureate Leon Lederman. CERN's Llewellyn Smith is guarded, however: "We have to see how many physicists want to come here," he says.

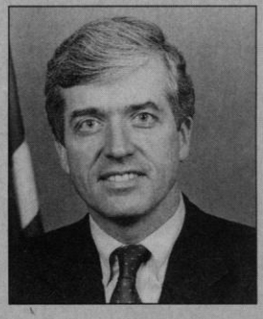
The only other prospect for reaching energies well above those available today—the Next Linear Collider (NLC)—is far less promising as an SSC substitute. On the very day the Super Collider died, researchers met at SLAC to discuss early plans for this dream machine, which was to be the SSC's companion and successor. To be built as an international collaboration, it would accelerate particles toward one another down a straight path tens of kilometers long and collide them at energies comparable to the SSC. So far, however, the international participants, from Japan, Germany, and the United States, haven't even agreed on a design.

And unlike the SSC, the NLC is poorly suited to flushing out new discoveries, such as the Higgs particle. The SSC would have cast a wide net because it would have collided protons, which are mostly empty space inhabited by three smaller particles, the

The Endgame

For supporters of the Superconducting Super Collider (SSC), the end of the world came just as T.S. Eliot had predicted: not with a bang but a whimper.

The whimper was an arcane parliamentary maneuver in the House of Representatives over a report, written jointly by a conference of two dozen senators and representatives, that was expected to be a final spending bill for energy and water programs for the fiscal year that began on 1 October. Conference committees are supposed to craft a compromise bill from legislation passed separately by the House and Senate, and each house must approve their handiwork before it can be sent to the president. Usually that's a formality, but not this time.



Persistence pays off. Rep. Jim Slattery stalked the SSC for years.

Opponents of the SSC had won a House vote in June to kill the project, but the Senate approved $640 million to continue construction. Earlier this month, the conference committee sided with the Senate's position, giving the project the full $640 million. At that point, even opponents believed that they had lost the battle, at least for this year (*Science*, 8 October, p. 171). After all, that's what happened last year, when the House backed down from an earlier vote to kill the project and accepted continued funding, although at a slightly lower level. But this year, when the conference report came up for a vote in the House, opposition to the SSC had hardened in part because many representatives were outraged that the conference committee had failed to acknowledge their stance.

The decisive vote came on a motion by Representative Jim Slattery (D–KS), a long-time opponent of the SSC, to send the report back to the conference committee with instructions to delete funding to continue with the project. It passed by 282 votes to 143. In effect, the House signaled that it was prepared to hold the entire $22 billion bill hostage if necessary. Two days later, the conference committee bowed to the inevitable and deleted all research and construction funds for the SSC from the bill. Instead, the entire $640 million will now go to terminate the $11 billion project.

–Jeffrey Mervis