

themselves are involved in preservation, their efforts to record history have more clout. This turn illustrates another concern of Seidel's: Because history isn't really a laboratory's mission, the next budget cycle can bring a premature end to historical archiving. People get excited, he said, and projects get funded—then they're not excited, and funding goes away. But the project at Sandia and similar ones at the other facilities are primarily technical, not historical. In addition to the oral interviews, they are designed to archive test data, computer codes, engineering drawings and so on.

As the person responsible for Livermore's entire weapons program archiving effort, William Bookless wants to coordinate the weapons archiving projects at the nuclear laboratories and plants. To that end, he organized a first workshop in late September, attended by representatives from the US weapons complex and the Atomic Weapons Establishment of the United Kingdom, "to address the overarching issues" shared by all. Bookless has been motivated strongly by technological reasons, namely the loss of the "tool" of nuclear testing, but when historian Hacker and assistant archivist Steve Wofford heard about the workshop, they "pushed" (Hacker's term) their way in. Bookless, who says he is pleased about the wider scope of the project, told us that attendees "discussed how we will discuss these issues" and how to "avoid duplicating efforts."

Worth preserving?

When the wheel is nuclear weapons, maybe having to reinvent it isn't such a bad idea. And as the US struggles with massive social problems such as crime, poverty and health care, how much effort (and how many dollars) should go into retaining this particular "arcane" know-how? When asked about these issues, the people at the weapons labs said they feel a responsibility to preserve the knowledge of science and technology generated by almost 50 years of intense military research.

Johnstone, who admitted that he was getting on a soapbox, told us: "It is not our decision whether or not to ever use this information again, but it is clearly our decision to see to it that it is at least archived and accessible." He sees the knowledge "as a resource that can either be drawn upon or buried forever—that's a decision that will be made by others, but at least they'll have the opportunity to make it."

Bookless too realizes that not everyone shares Johnstone's and his

views: "It's the whole argument about whether we should even have a nuclear deterrent. That's a philosophical thing, and people have honest opinions on both sides."

However, Bookless endorses the projects' *raison d'être*. "My own opinion is that the nuclear deterrent has

to be part of our national security strategy for some time to come, and given that, I think we would be, at this laboratory, irresponsible if we didn't ensure that that nuclear deterrent was safe, secure and reliable. That's our job."

—DENIS F. CIOFFI

COLLABORATORS AWAIT EUROPEAN APPROVAL OF LHC

Physicists hoping to participate in the European Large Hadron Collider are beginning to feel pretty testy about the question of when and indeed whether CERN's proposed project will receive definitive authorization. At an estimated cost of around \$2.5 billion, counting detectors, the proposed 14-TeV proton-proton collider would appear to be a bargain by comparison with the now-scrapped Superconducting Super Collider, the 40-TeV US machine that would have cost upwards of \$10 billion. But of course just because something is a bargain does not mean that one has to buy it if one does not want it.

In principle, approval of the project by the 19 member countries of CERN's council could occur as this article goes to press. But the times when leaders and spokespersons for CERN confidently predicted authorization "any minute" are long gone. Approval originally was expected at a council meeting last June. Then, when an impasse developed between the Federal Republic of Germany and Britain on the one hand and France and Switzerland on the other, the June meeting was technically held open until the end of September in hopes that differences could be bridged by then. Now the lab's leadership is saying that the June meeting could be extended until the next regularly scheduled meeting, on 17 December—and that authorization might not come even then.

The ostensible and very likely the whole reason for the repeated delays is a stubborn disagreement between Germany and the UK—Europe's most budget-conscious countries—and France and Switzerland, the so-called CERN host countries, over how big an extra contribution the hosts should make to construction of the LHC, given the special benefits they will reap from having the project built on their soil.

But the longer the delays go on, the more even those very close to the action worry that something else might be wrong. Members of the CERN council "don't seem to be get-

ting along as well as they should," confided one member of the lab's leadership in a recent interview with this magazine.

Physicists in the United States and Japan are eager to get some modest funding immediately to support work they want to do for the LHC, but they cannot hope to make any progress with their own governments until the Europeans have their act together.

Japanese particle physics leaders, having made a quiet but concerted behind-the-scenes effort to obtain support for the SSC, naturally are afraid of being burned twice. Hiro-taka Sugawara, the head of KEK, Japan's particle physics lab in Tsukuba, complained rather bitterly at a recent high-level meeting in Lausanne, Switzerland, that physics leaders outside Europe could hardly make convincing cases to their own governments if the Europeans continued to disagree—and he warned that interest in the LHC outside Europe might begin to flag.

Ultimately, as long as all this is unresolved, one cannot help having uneasy thoughts about whether the idea of building the biggest proton-proton collider ever in order to hunt for the Higgs boson and for first evidence of supersymmetry might be somehow jinxed. In *The God Particle*, a book written to make a case for the SSC or some similar machine, former Fermilab director Leon Lederman obsessively conjured up images of hubris—the Tower of Babel, Moby Dick.

Germany at the crux

According to Maurice Jacob, the CERN theorist who serves as the lab's secretary of state for member-state relations, Germany and Britain have demanded that the host countries kick in 290 million Swiss francs, an extra 10% of the LHC's machine cost, on the model of practices at labs like the European Synchrotron Radiation Facility at Grenoble, France, and the Joint European Torus at Culham, England. But, as France and Switzerland point out, ESRF and JET are not true international organizations

like the European Space Agency, the European Southern Observatory or CERN itself, and there is nothing in the CERN constitution requiring the host countries to make extra contributions—though in practice they have done so quietly and on a modest scale in the past.

As things stood at the end of September, France and Switzerland first had offered to pay 82 million Swiss francs for the LHC. This was rejected, and the hosts have now upped their offer to 138 million. They have indicated that they might go just a little higher, but Germany, for its part, has not indicated what an acceptable compromise figure might be.

Shortly before Germany's national election on 16 October, which returned Chancellor Helmut Kohl's conservative coalition government to power, Jacob told PHYSICS TODAY it was his impression that "a man to convince" in the German government was the number-two person in the German research ministry, Gebhart Ziller. Ziller is a politically well-connected civil servant who in principle would remain in place regardless of what kind of government emerged from the election, though he is rumored to be considering retirement.

Ziller is said to be anti-big-science, and Germany has a general policy of not increasing its contributions to international big science projects. From the point of view of US physicists hoping to participate in the LHC, it is not reassuring to suppose that Ziller has yet to be persuaded of the LHC's merits. Yet it is somewhat reassuring to note that the LHC has not been violently controversial in Germany's physics community or broader scientific communities, the way the SSC was in the United States. *Physikalische Blätter*, Germany's counterpart to PHYSICS TODAY, has not been inundated with letters critical of the LHC.

Hanging in the balance

Waiting with bated breath for Germany's decision are some 500 physicists in the United States who hope to participate in the two LHC detector collaborations, CMS and Atlas, or who have been invited to contribute to the design and construction of the machine itself.

Most advanced in terms of allocation of tasks is the US group collaborating with CMS, which includes 270 physicists from 38 institutions. Its US spokesperson, Dan Green of Fermilab, reports that it is slated to have management responsibility for the hadron calorimetry and end-cap muon subsystems of CMS and some management

responsibility for the data acquisition and high-level trigger systems. In addition, the US group has been assigned some construction responsibilities, for example, the complete barrel for the hadron calorimeter.

Green elaborates: "We are to build three of the four stations for muon detection and to design the steel absorber structure" for the end-cap system. "In the electromagnetic calorimeter we will make tooling for the crystal detectors and build one-fourth of the front-end electronics and transducers. In the central tracker we will build all the forward pixel silicon detectors and one-quarter of the microstrip gas chambers."

The Atlas group, which includes physicists from 27 US institutions and has Bill Willis of Columbia University's Nevis Lab as its spokesperson, already is highly organized internally but is not so far along in its negotiations with CERN—perhaps partly, suggests George Trilling of Lawrence Berkeley Lab, because Atlas was bigger than CMS to begin with and less in need of outside support. Trilling's impression is that in Atlas, responsibilities will be shared in a somewhat more diffuse way between the European and non-CERN participants.

Completely separate from the detector collaborations is a third US group, headed by leading accelerator expert Robert Palmer, of Brookhaven National Lab and the State University of New York at Stony Brook. That group is devising ways US-based physicists could help with the design and construction of the ring itself. The idea is to come up with well-defined activities that could be done in the US and paid for by the US government. Palmer reports, however, that workshops at CERN and Brookhaven have produced a wish list that would cost more than twice the ballpark figure of \$400 million that the High Energy Physics Advisory Panel subpanel led by Sidney Drell recommended the US government allocate to the LHC over the lifetime of the project (see PHYSICS TODAY, July, page 51).

Another thorny problem, Palmer concedes, is that European laboratories already are hard at work in some of the areas where US expertise is especially strong and might otherwise be highly prized.

In sum, it is hard to believe that a project so well conceived, long planned, thoroughly negotiated and widely desired would be killed at the last moment, but stranger things have happened.

—WILLIAM SWEET

SOROS'S ISF TO SERVE AS A CONDUIT OF AID TO THE FSU

With most of its awards already distributed to researchers and science organizations in the former Soviet Union, the International Science Foundation now encourages other organizations to use the paths that it has paved into the administrative jungle of the FSU and Baltic countries. For a fee of 10% of the value of the donated resources, nonprofit and government agencies that wish to fund noncommercial research are eligible to participate in ISF's new Grant Assistance Program.

In late 1992 George Soros established the ISF to preserve scientific activity in the FSU (see PHYSICS TODAY, January 1993, page 63). However, the infrastructure to funnel resources did not exist, said Isaac Skelton, program officer for the ISF long-term research grants program.

The many target countries required many separate agreements. ISF and other organizations found that they needed to develop good relationships with both governments and banks. During the last two years ISF has granted substantially more than any other group—about \$80 million in cash, materials and travel support. What's more, Skelton claims that ISF has been uniquely successful in actually getting large quantities of money and material into the FSU and Baltic countries.

Other testimonials would seem to support that claim. For example, in a February editorial urging continued aid for the FSU, *Nature* opined that Soros had created "a mechanism for helping Russian science to survive that should be used (or at least copied) by others, public and private." Then, on 25 May V. Chernomyrdin, the Prime Minister of the Russian Federation, issued decree number 532, which exempted ISF from paying customs duties and value-added taxes. ISF will now make these exemptions and additional services available to those who work through the foundation. Irving Lerch, director of international affairs for the American Physical Society, agrees that any organization that does not already have smooth channels into the FSU should use ISF.

Any nonprofit or government organization that wishes to participate in the Grant Assistance Program should contact David Lindeman at 202-342-2760 or info@isf.org.

—DENIS F. CIOFFI ■