cerns. They are enthusiastic about other fields of science and the aspirations of those fields. They do not want the SSC to be built at the expense of other sciences. But it is an instrument that the whole U.S. high energy physics community sees as the next necessary step. We ask that other scientists examine the fundamental science that the SSC will explore. We firmly believe that they can support the importance of that science and join us in exploring the energy frontier with the SSC.

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My article was based on remarks made by the principal SSC scientists at the symposium as well as the press conference, a stack of written material provided by the organizers, and a private interview with Leon Lederman.

During the press conference, Lederman stated plainly that the purpose of the seminar was to convince scientists in other fields that the program was worth its cost. As Jackson reports, a high school science teacher did say "you have our support" at the end of the session. But he does not mention that the response from the podium was an exultant comment by one of the organizers that "It worked! It worked!" (The remark is audible on side 2 of tape number 85AAAS-57, available from Mobiltape Company, Inc. in Glendale, California.)

Perhaps the most authoritative source of information on the SSC's cost is the Central Design Group's "Siting parameters document," issued on 15 June, which lists a total figure of $4 billion (in 1984 dollars). This figure has been frequently cited by Lederman, Sheldon Glashow, and Maury Tigner. As to Jackson's point about URA funds going strictly "to the science," $15,000 was also used to publish 10,000 copies of the pamphlet mentioned in my article—essentially a fancy sales brochure.

Finally, it should be noted that, although Rolf Sinclair serves as secretary of the AAAS physics section, he is employed full-time as program director of the division of atomic, molecular, and plasma physics at the National Science Foundation.—R. JEFFREY SMITH

My references to the costs of CERN's Large Hadron Collider (LHC) were not uncritical. The sum of "less than $1 billion" was described as an "informal estimate," and I explicitly stated that this depended on important factors such as the successful development of new superconducting magnets.

Nor have I "distorted the U.S. position on international cooperation," since I did not say, as Jackson implies, that Europe had made any formal request for U.S. participation in the LHC. The "frosty reception" referred to the atmosphere in informal discussions and was based on interviews with several CERN physicists. Jackson's words "grossly unfair" are therefore based on a misinterpretation of what I actually wrote.

—DAVID DICKSON

Hydroelectricity from Canada

The editorial "Electric power from the north," by Philip H. Abelson (28 June, p. 1487) sings the praises of use by the United States of relatively cheap hydroelectricity generated in Canada. Certainly there are benefits: less radioactive waste; fewer strip mines; fewer oil spills; less acid rain from hydrocarbon-fired utilities; less reliance on petroleum imports from abroad; and saving of hydrocarbons for future pharmaceuticals, plastics, and lubricants. If the electricity is less expensive than what can be produced in the United States, the United States saves, and Canada gets probable short-term profits and possible long-term problems.

In some places, dams are useful for hydroelectricity, navigation improvement, flood control, water supply, and recreation. The dams being built in Canada do not have locks, so river travel will become more difficult. There is little need for flood control, water storage, or additional recreation facilities in the areas where the dams are being constructed because of low population density and abundant glacial lakes.

Abelson states that Robert Bourassa of Quebec "emphasizes the hazards and environmental damage arising from nonrenewable sources of electricity while extolling the value of clean, renewable hydropower." All methods of generating electricity are hazardous to a degree and cause at least some environmental damage. Let us not forget the 1976 Teton Dam failure in eastern Idaho or the magnitude 6½ earthquake in 1977 that may have been caused by the weight of the Koyna Reservoir in India. The Canadian reservoirs drown riparian habitat, affect plant and animal communities, and may cause extinctions and climate change. Did we imagine the effect on salmon runs when we began damming the Columbia River before World War II? Will waves erode the reservoir shorelines? Will the reservoirs trap sediment that nourishes coastal beaches? If a reservoir fills with

sediment in a few centuries, is hydroelectricity truly renewable energy? What about the ecological, aesthetic, and recreational value of natural lakes, free-flowing rivers, gorges, rapids, waterfalls, and wilderness? Think of the extinct rapids beneath the reservoirs of the Snake and Colorado rivers. We may dismantle the transmission lines, but the dams and the sediment behind them are forever.

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How Much for Research?

Leonard Sagan (Letters, 21 June, p. 1382) argues that no causal relationship has been demonstrated between mortality and wealth. But mortality is not the sole measure of health. It is undeniable that wealth has something to do with the quality of life while it is being lived, and although we may not have been able to extend its length by expenditure of funds, it is unquestionable that we have been able to improve its quality, both in terms of lower morbidity and greater mental health. But the question is not whether we should spend or not spend on research. The question is how much. When does one reach a point of diminishing returns? Anyone asking for research funds should be able to tell the funding source what minimum value society will gain from answering the question his or her experiments address. That this is not an unreasonable requirement is demonstrated by the fact that such questions are asked and answered daily in industrial research.

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The Fajada Butte Solar Marker

Zeilik (Reports, 14 June, p. 1311) adds to the published data (*1*, *2*) indicating that site 29 SJ 2387 at Chaco Canyon, New Mexico, did not work as described by Sofaer *et al.* (*3*, *4*). However, one of Zeilik's conclusions does not follow from his argument, and he also omits an important ethnographic fact.

Zeilik concludes that 29 SJ 2387 was probably a sun shrine and states, "The turns in the spiral could then mark out a rough planting calendar" (p. 1312). Arguing earlier against the use of 29 SJ 2387 as an accurate solar calendar, he correctly cites ethnographic accounts to show that Pueblo sun-watching sites are (i) usually unmarked and (ii) easily accessible to the Sun Priest. These same accounts and others (*5*) also note that planting times and dates for other subsistence activities are set using sun-watching stations. Zeilik notes that these calendars are much more accurate than the Fajada Butte feature. The same is true for known prehistoric Anasazi solar alignments (*5*), making 29 SJ 2387 unneeded. Furthermore, the difficult access to Fajada Butte that makes the butte an unlikely place for sun-watching also makes it an unlikely location for *any* calendrical marker, even a "rough" one.

Finally, like Sofaer *et al.*, Zeilik does not mention that among the Pueblos spirals represent water or serpents (*1*, *6*), not the sun. "Sun and water are necessary elements for farming, but they are distinct elements in Puebloan symbolic systems. Serpents are associated with both sun and water . . . but are similarly distinct" (*1*). Ethnographically there is little to indicate that 29 SJ 2387 is Pueblo; by extension, other than because of its location at Chaco Canyon, the designation of 29 SJ 2387 as Chacoan Anasazi remains unproved. The slabs and other geological features are probably natural (*1*, *2*), not cultural, and the two spiral petroglyphs could be Navajo.

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Iowa, Not Ohio

John K. Smith and David A. Hounshell wrote a fascinating account (Articles, 2 Aug., p. 436) of Carothers' career at DuPont. They erred, however, in identifying my affiliation in 1928 as Ohio State University. I was then, and remain to this day, a professor at Iowa State University.

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