

Cuts in Science Funding Fuel U.S. Regression

Construction on the world's most powerful atom-smasher began beneath the plains of Texas in 1991. The Superconducting Super Collider would be housed in a tunnel 54 miles in circumference and was expected to reveal many secrets relevant to the nature of the universe by recreating the conditions immediately after the "Big Bang." In 1993, after \$2 billion had been spent on buildings and digging 15 miles of the huge tunnel, Congress scrapped the project.

A European scientific group known as CERN (a French acronym for the European Council for Nuclear Research) will soon pick up where the United States left off when it flips the switch on its own version of the SSC: the Large Hadron Collider (LHC). The European machine is 17 miles in circumference, about 300 feet below the surface of the earth and spans the countries of France and Switzerland.

It collides counter-rotating beams of protons together and detects the showers of subatomic particles with precision detectors that are seven stories high. The instrument could arguably be considered the magnum opus of humanity, the crowning achievement of our species.

The protons make 11,245 laps around the 17-mile beam tube each second. Although the proton beam has a mass of only one ten-thousandth the mass of a grain of sand, it is moving so close to the speed of light that it has the energy of a 30,000-pound fighter jet moving at 500 mph. The control of the proton beam is so precise that the tube through which they travel is less than 3 inches in diameter.

Europe's new collider also provides strong evidence that the U.S. position as the world's leader in fundamental scientific research was a temporary one. A little reflection reveals that the honor probably never really belonged to us in the first place.

The only reason the United States enjoyed a run as the center for scientific research is that Adolf Hitler and Benito Mussolini chased the great scientists out of Europe with their misanthropic and militaristic policies. From 1933 to 1941, about 100 top physicists emigrated from Europe to the United States. These physicists were not only instrumental in the success of the Manhattan Project, they stayed in the U.S. and filled positions at universities around the country. They produced thousands of Ph.D. physicists and drew more of Europe's top students for decades to come.

A look at the home countries of scientists who were awarded Nobel Prizes in physics is compelling evidence in support of this idea.

Before 1935, European scientists dominated the Nobel Prize in physics. Scientists in the U.S. were awarded a total of two and a half Nobel Prizes before 1935. Virtually all the rest went to Europeans — 10 were from Germany, and the rest were from France, the United Kingdom, the Netherlands, Austria, Italy, Sweden, Switzerland and one from India. From 1936 on, after the exodus of top scientists from Europe, the United States won all or part of the Nobel Prize in physics in 45 of the 69 years it was awarded.

Enrico Fermi immigrated to the U.S. in 1938 upon being awarded the Nobel Prize in physics. He elevated the physics department at the University of Chicago to international status by producing seven Nobel Prize winners among his students. Hans Bethe jumpstarted Cornell's physics department, winning a Nobel Prize in physics in 1967. Felix Bloch left Germany upon Hitler's ascent to power and took a position at Stanford University in California, where he won the Nobel Prize for developing magnetic resonance imaging in 1952.

Emilio Segrè, an Italian Jew, was instrumental in elevating the physics department of University of California at Berkeley to the lofty status it now enjoys with his nuclear research. He won the Nobel Prize in physics in 1959. Hungarian mathematician John von Neumann and Albert Einstein were founding members of the Institute for Advanced Study at Princeton.

The positive effect that this bounty of top scientists from Europe had on American science is fading fast. While many foreign students still come to the United States for college and graduate school, many are now choosing to return to their home countries rather than staying in the U.S.

Our nation is rapidly becoming the "muscle" of the planet, while Europe is regaining its status as the "brains." This regression will continue as long as we proceed to cut funding for fundamental scientific research while spending hundreds of billions of dollars on war.

The federal budget for fiscal year 2008 cut \$94 million in funding for high energy physics, and layoffs are expected at key national laboratories. In order to maintain our status as a "world leader," we have to value fundamental scientific research. We obviously can't rely on another mass influx of top foreign scientists like the one that occurred in the 1930s.

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