LETTERS

DOE's Jefferson Lab: What's in a Name?

Lawrence Cranberg's comments on traditions of naming publicly funded enterprises, with emphasis on the Thomas Jefferson National Accelerator Facility ("Letters," February, page 13), got me thinking—perhaps because I wrote my dissertation on the founding of Fermilab, because I now serve as the Jefferson Lab historian and because I have an ongoing history project at Berkeley Lab, which just went through its own name change.

The National Accelerator Laboratory was renamed the Fermi National Accelerator Laboratory at the instigation of a group of Italian-American congressmen who wanted national recognition for an Italian scientist. The Radiation Laboratory in Berkeley was first renamed for its city and founder after Lawrence's death, and recently became the Ernest Orlando Lawrence Berkeley National Laboratory. Several labs, such as Argonne National Laboratory, bear local place names. The Clinton P. Anderson Los Alamos Meson Facility was named for a prominent New Mexican congressman.

As a professional listener, I can tell you: Name changes provoke discomfort and questioning. At the laboratory, people ask, How dare they change our name without my permission? Outsiders ask, Who do they think they are? And then there are the jokes: Why don't we just call it The Lab? All the while, change brings complications and continued challenge. In the old days, the Berkeley Rad Lab was confused with the MIT Rad Lab; today, Berkeley Lab is confused with its sister lab in Livermore. Fermilab is sometimes mistaken for the Fermi reactors.

Those who question name changes are on the right track; after all, names should fairly identify who we are and our place in the world. Overall, I think the names of laboratories remind us that publicly funded scientific projects have a wide constituency: They serve political and cultural, as well as scientific, interests, and they represent cities and regions, as well as our nation as a whole.

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Why rename the Department of Energy's Continuous Electron Beam Accelerator Facility (CEBAF) as the Thomas Jefferson National Accelerator Facility? Here in Virginia, at Jefferson Lab (of which I am the director), we see the new name as a fitting statement not only about science and the past, but about science and the future.

Virginia-born Thomas Jefferson's fundamental importance in American science is well documented. As a student at the College of William and Mary, he transformed his fascination with the natural world into a disciplined scientific outlook—one that incorporated not only a devotion to Isaac Newton's works, but the habit of applying mathematics to practical problems. He went on to study and practice the sciences all his adult life, acquiring an overall knowledge unmatched outside Europe. In fact, he actually considered himself a scientist whose civic duty happened to include politics.

Jefferson's scientific interests included astronomy, botany, chemistry, geography, meteorology, mineralogy, physics and zoology. He was the early leader in American paleontology, an original proponent of vaccination and the first scientific archaeologist. He conducted his innovative architectural and agricultural enterprises at Monticello scientifically. His influential *Notes on the State of Virginia* cataloged a wealth of data on physiography and flora and fauna, as well as human activities.

In the same spirit of intellectual internationalism found today at Jefferson Lab, he continually collected, distributed and corresponded about new scientific information across his two-continent network of scientific contacts. He gave 46 years to the American Philosophical Society (America's first scientific organization), which

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was founded by Benjamin Franklin, modeled on the Royal Society and dedicated to promoting useful knowledge. He called becoming its president in 1797 his life's "most flattering incident," though he took office the next day as vice president of the US. And he stayed on as the society's president through both his terms as US president and for five years into his retirement.

Though wary of government expansion, Jefferson conceived of the Federal support of science. His report on distilling freshwater from saltwater may have been the first scientific paper published under government auspices. Historian Silvio Bedini calls him "the father of the Bureau of Standards," and attributes to his influence the establishment of early scientific agencies such as the weather bureau. Jefferson planned and organized the Lewis and Clark expedition to, in his words, "extend . . . the boundaries of science." Small wonder that Harvard University physicist and historian of science Gerald Holton has declared that more than any other high public official of any era, Jefferson dramatized and promoted the sciences for human progress.

Holton has compared the Lewis and Clark venture to "a research program by which science serves both the search for truth and the interest of society." Jefferson Lab serves that same dual purpose. With our users, we serve the purely scientific purpose of investigating the quark structure of nuclei. With industry and the Navy, we also serve the interest of society in developing versatile, high-average-power free-electron lasers based on our superconducting RF accelerator technology.

Historian John C. Greene has heralded Thomas Jefferson as "a symbol of American respect for science and faith in its power to promote human progress." The founding of CEBAF reflected the value the nation places on that respect and faith. Now, the nation has given our lab precisely the right name. We intend to live up to it.

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US Position on Test Ban Treaty Explained, Key Terms Clarified

The comprehensive test ban treaty (CTBT), signed at the United Nations in New York on 24 September 1996 by President Clinton for the US and subsequently acquiring more than 140 other signatories, bans all nuclear explosions—of any size, at any time and in any place. It is referred to as a true zero-yield CTBT.

During the coming months, leading up to the treaty ratification process, there will be extensive debate in this country as to what are the "permitted activities" under the CTBT that Los Alamos, Lawrence Livermore and Sandia National Laboratories will rely on to ensure the continuing safety and reliability of our enduring nuclear stockpile as it ages and shrinks in the years ahead.

I am writing this letter to correct serious inaccuracies and ambiguities on this subject that occurred in PHYSICS TODAY news stories in December 1996 (page 37) and March 1997 (page 63). The problems concern the meaning of the term "subcritical experiments" with reference to activities that the US plans to continue at the Nevada Test Site, and whether these activities would be consistent with the CTBT.

"Subcritical experiments" are very different from the low-yield underground nuclear tests with which they have been confused in the two PHYSICS TODAY stories. In a low-yield test explosion, the nuclear device is generally assembled with less fissile material and/or altered detailed features from a stockpile warhead to ensure that the fission chain reaction will terminate before the release of nuclear energy exceeds a deliberately preset limit. A device is said to have exceeded criticality when a fission chain reaction is initiated and produces exponential multiplication of neutrons. When the total nuclear energy release does not exceed the energy release from 4 pounds of TNT, the test is commonly referred to as a hydronuclear test; such explosions were carried out by the US in 1959–61 during the nuclear testing moratorium with the USSR and the UK.

In the US prior to the 1996 signing of the CTBT, a number of senior administration leaders in defense and national security affairs advocated that "permitted activities" include underground nuclear testing at yields of up to approximately 500 to 1000 tons of TNT. Such testing would allow studies to be undertaken of boost gas initiation and initial burn, which represent a critical step in achieving full primary design yield for igniting the secondary, or main stage, of a modern thermonuclear warhead.

In contrast to these activities, subcritical experiments involve such limited quantities of plutonium-239 that