

How Berkeley Invented the Bomb

Artistically, UC Berkeley can be seen as a self-satisfied suburb of a provincial city. Science, though, is another story. The university is a leading research institution, and it all started with the bomb.

More precisely, it started with Ernest O. Lawrence, the physicist whose development of the cyclotron—the “atom smasher”—at Berkeley attracted more physicists and, ultimately, gave Berkeley the lead research role in the development of the atom bomb during World War II. It was Lawrence who brought Berkeley its first Nobel Prize in 1939 for the cyclotron.

Though peace-loving Berkeleyans may hate to admit it, the atom bomb was largely conceived in Berkeley by scientists associated with Cal, although the hands-on work—producing U-235 and plutonium, assembling components,

testing—took place elsewhere. The plutonium powering the bomb that exploded over Nagasaki was discovered at Berkeley.

J. Robert Oppenheimer, the Berkeley physicist, led the project's research team and directed the Los Alamos lab. The top-secret effort, in fact, spanned the country, with research underway in Chicago, New York, and many other cities and universities. Scientists came from all over, including Europe.

The Wet Suit

Not every scientific advance in Berkeley won a Nobel Prize. One that did not, but is notable nonetheless, was the invention of the wet suit by Hugh Bradner in the early 1950s. Divers and surfers have been thanking him ever since.

The suit's development shows just how scientifically important and versatile an institution Cal had become. Bradner, a Cal physicist at the radiation laboratory, had the inspiration that underwater swimmers could stay warm without staying dry—hence, the term “wet” suit. Air bubbles trapped in the material would provide warmth.

The effort, which was originally undertaken for the U.S. Marine Corps and the U.S. Navy, involved a team of scientists and engineers from the university.

A prototype designed for commercial use was produced in 1952. Bradner never patented the suit and never tried to profit from it. His interest remained scientific; he went on to serve as a professor at the Scripps Institute of Oceanography at UC San Diego.



1938: Ernest Lawrence in his radiation lab, at the controls of the thirty-seven-inch cyclotron in 1938. Courtesy of the Bancroft Library of the University of California, Berkeley.

Headquarters was briefly in New York City, hence the name "Manhattan Project."

"Lawrence was the spark that turned the University of California from a backwater institution to a world leader in science," said Charles Shank, who was later head of the Lawrence Berkeley Laboratory.¹

Lawrence, Berkeley's youngest professor when he was hired at age twenty-seven in 1928, created the Radiation Lab with president Sproul's strong backing. The lab developed the cyclotron—at first a four-inch device but by the end of the war, 184 inches—that used magnets to speed up and eventually smash atomic particles. Besides inventing nuclear medicine, the lab helped make the bomb possible.

For a time, Lawrence and "Oppie," as he was called, were close friends, spinning out theories while walking in the Berkeley Hills or listening to classical albums at Oppie's home in the hills. Physicists hashed out details of the atomic bomb over dinners at Spenger's and Trader Vic's.

It was at Spenger's that Edward Teller discussed his idea for a "Super-bomb"—later called the H-bomb—and warned that its explosion might set off a chain reaction that would incinerate the planet.

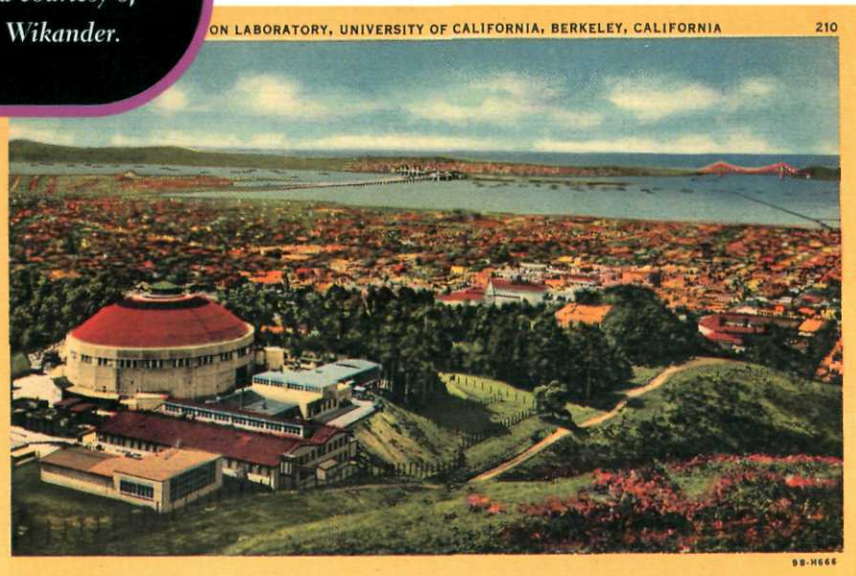
Places

Lawrence Berkeley Lab, an ever-expanding complex in the hills above campus, can be toured by appointment.

Postcard courtesy of Sarah Wikander.

The paradox—Bohemian, Leftie, and seat-of-the-pants Berkeley helping develop an atom bomb in top-secret—was apparent early on, especially to such federal overseers as the FBI. From early 1941, shortly after Lawrence embarked on a crash program to develop the bomb, Washington worried about his "cavalier attitude to security," according to historian Gregg Herken, whose eye-opening "Brotherhood of the Bomb" draws from declassified U.S. government files, Soviet communications with American spies, and Communist Party records.²

The feds had reason to worry about Lawrence's lackadaisical security. A federal investigator simply walked up "Cyclotron Hill" above campus and spent hours perusing "secret" blueprints unmolested.



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But it was Oppenheimer who really had federal officials quaking because of his friendships with Communists and other leftists, including his wife and his brother, and his involvement with Communist front organizations. Oppenheimer was also

suspected of treason because he refused to divulge the name of a friend who'd been contacted by a Soviet spy. The spy wanted to meet scientists who were working on the bomb. Oppenheimer did tell investigators about the incident, however, and under pressure finally revealed the name of his friend, Haakon Chevalier.

Oppenheimer's phone and home were bugged, and he was assigned two "bodyguards" whose job was to spy on him. Army counterintelligence agents worked from a spy house south of campus. When Oppie and Chevalier conversed at Oppie's home in the hills, they did so in a wooded grove to avoid detection. The FBI set up a project dubbed CINRAD (Communist Infiltration of the Radiation Laboratory).

Oppenheimer was finally stripped of his security clearance in 1954, in part because he opposed developing an H-bomb—the issue that destroyed his friendship with Lawrence.

Although Oppenheimer never betrayed the United States, some of his Manhattan Project colleagues had done so, including young scientists who were seen giving documents to Soviet agents. Several were fired. One was drafted, to get him out of the way while keeping the story quiet. Later he was unsuccessfully prosecuted.

Scientists and policy makers agonized about the decision to use the bomb. Lawrence "was the last to come around on actually bombing Hiroshima," his wife, Mary, claimed, years later.³ The day after the bomb dropped on Hiroshima and the day before it fell on Nagasaki, the *Berkeley Gazette* bragged: "Credit UC prof for new bomb," meaning Oppenheimer. Three weeks later, the paper proclaimed, "UC helped to end war, ensure peace."⁴ Berkeley scientists, led by Edward Teller, were already developing the H-bomb.

The University's Nobelists

The Nobels have kept coming for Cal scientists, social scientists, and humanists. A recent count listed twenty Cal faculty and twenty-four alumni winners.

Chemists John Northrop and Wendell Stanley won for preparation of pure forms of enzymes and virus proteins in 1946, and chemist William Giaque won for a magnetic refrigeration system in 1949. In 1951, Edwin McMillan won for discovering neptunium, and Glenn Seaborg for plutonium; two years later Owen Chamberlain and Emilio Segré won for discovering the anti-proton.

Donald Glaser won the prize in 1960 for developing

the bubble chamber, a useful tool in the study of atomic physics. Luis Alvarez won the prize eight years later for improving on the bubble chamber.

In 1997, Steven Chu won the prize for using lasers to "trap" atoms in place for easier study.

Winners in economics have included Gerard Debreu (1983), John Harsanyi (1994), and George Akerloff (2001), who explained why markets do not always behave as economists predict.

Poet Czeslaw Milosz won the Nobel Prize in literature in 1980.

How Berkeley Invented the Hot Tub

Sitting in a hot tub beneath the stars while sipping chardonnay may be associated in the public mind more with Marin County or Malibu than with Berkeley. Hot tubs seem too sybaritic for Berkeley—not challenging enough. But it was in Berkeley that the modern hot tub—complete with spritz—got its birth. Remember how Berkeley invented the good life?

The Jacuzzi Co., founded in West Berkeley in 1915 by a family of Italian emigrants, produced airplane propellers. The firm had its greatest success with irrigation pumps. But its name never became synonymous with a product until fifteen-month-old Kenneth Jacuzzi, who was born in 1941, came down with rheumatoid arthritis. His father, Candido, took a look at the prescribed hydrotherapy bath and decided, “Why, that’s just a pump!”¹ He built a submersible pump to use at home between his son’s regular therapy sessions.

By the mid 1950s, they were marketing the Jacuzzi for recreational use, using Jayne Mansfield for their spokeswoman. By 1968, the pumps were incorporated in freestanding units, and the Jacuzzi as we know it was born. By the mid-1970s, the hot tub had become a lifestyle, appearing on live-oak shaded decks everywhere and in health spas—including Berkeley's Holistic Health Center on College Avenue, which, like many of its brethren, branched out into such "healing arts" as herbology and "psychic awareness."

"Interest is tremendous," manager Edward Bauman bragged.²

tainly didn't see them as something to emulate. She proposed a "Yuppie Abatement District," after all.

But marketers took yuppies seriously. "Detroit's New Goal—Putting Yuppies in the Drivers Seat," *Business Week* reported the next year, Schulman revealed.

This may be why Kahn—a member of the Berkeley Women's Health Collective who became a writer to educate people about health—quit work as a columnist for the *Chronicle* and returned to nursing.

But satire was something she never regretted. "I felt I couldn't be flamboyant and goofy as a nurse practitioner," she said, "but I sure could be as a writer."²

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How Berkeley Invented Disability Rights

Berkeley has kinda, sorta invented many things. But among those things that undisputedly were invented in Berkeley, disability rights stands out for its importance. Today it is largely taken for granted that people using wheelchairs or walkers, or those who cannot see or hear, should be able to get inside buildings, use trains and buses, and attend concerts and films.

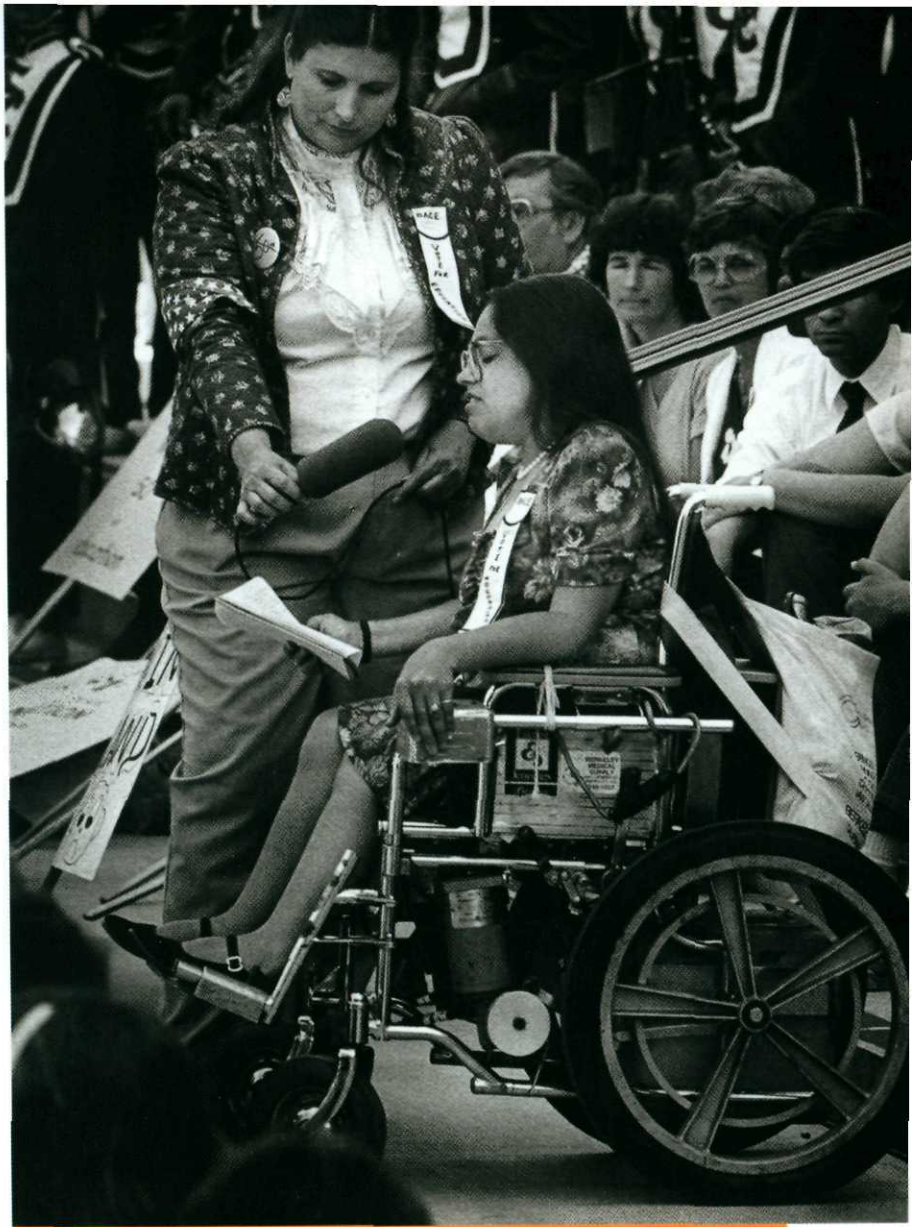
But that wasn't so back in 1972, when what is probably the world's first curb-cut—"the slab of concrete heard 'round the world"—was installed downtown at the northwest corner of Shattuck and Center Street.¹

Many of the federal laws that require accessible restaurants, stores, transit, and housing were devised in Berkeley by people associated with the Center for Independent Living and its offshoots. Hale Zukas, CIL's public affairs specialist, fought for and helped write regulations that later became the Americans with Disabilities Act, which took effect in 1992.

In the late seventies, Zukas—a persuasive man, even though his speech could barely be understood because of cerebral palsy—argued as a member of a federal panel on "architectural barriers" that train stations across the country should be remodeled to allow access for wheelchair users. Government officials smiled indulgently. Too costly, they said. Never will happen. But it happened.

More importantly, the concept behind those laws and the changes in public attitude that have followed were developed in Berkeley by a group of strong-willed cripples.

Still, when Ed Roberts, "the Gandhi of the disability rights movement," spoke about his life in a deep way, it wasn't about curb cuts or Section 504 of the Rehab Act.² It was about sex. To Roberts, after all, as to many of his followers, the struggle was about enjoying life to its fullest—a very Berkeley kind of attitude.



1970s: Judy Heumann spoke at a rally for special education in the late 1970s. Courtesy of photographer Jon McNally and the Center for Independent Living.



1970s: Ed Roberts, CIL's founder, needed extra oxygen often, but he didn't let that stop him from getting things done or enjoying life. Courtesy of the Center for Independent Living.

"Do you know that some disabled people have never enjoyed a single success in their lives?" Roberts told one reporter. "That there are disabled people put away in institutions right now that have never enjoyed the simple warmth and camaraderie of a family meal around a table?"³

Roberts, a junior high school athlete, spent two years in an iron lung after coming down with polio. "Maybe we should hope he dies," a doctor told Ed's mother, "because if he lives he'll be nothing more than a vegetable."⁴

Throughout his life, Roberts spent much of his time in an iron lung, due to a damaged diaphragm—"recharging myself," he said. To accommodate Roberts, the university turned a campus hospital ward into a dorm. Soon other disabled students followed, and Roberts helped create the Physically Disabled Students Program.

At Cal in the late '60s—the years of protest—he studied political science, having already mastered many of its moves. "Everywhere along the way," he told the *Gazette*, "I had to battle. As I won each of those battles I gained confidence in my ability to take on people or systems, and that was pretty important."⁵

But it wasn't till years later, he told the *Examiner's* Burr Snider, when Roberts saw that women could be interested in him as a man, that "I began to really care about myself and feel value about myself." His occupational therapist, attracted, she said, by "his tremendous ability to reach out with his voice," was soon showing up for therapy in low-cut blouses and miniskirts. Roberts, whose control over his limbs was slight, flirted by winking.

"So much sex is in your head," Roberts told a reporter. "I can feel all over . . . so I can have all the normal reactions and get turned on like any man."⁶

When Roberts wasn't winking, he put together the first organization in America—probably the world—that was run by and for disabled people with the goal of independent living. "Disabled people should run and control any organization created to serve their needs," the organization announced.

Starting in 1972 in a two-bedroom apartment, the Center for Independent Living (CIL) helped disabled people find places to live, on their own or with attendant care, locate jobs, and obtain job training.

Places

A sidewalk plaque marks the spot of the world's first curb cut on the northwest corner of Center and Shattuck.

Public bus and train operators whose vehicles couldn't handle disabled people soon heard about it. "Boy, do we work on transportation," Zukas told a reporter with his devilish grin. "We're suing everybody in the world."

CIL founded a shop to repair and redesign wheelchairs and other tools for independent living, including equipment that let people without limbs drive cars.

Vance Grippi, who decried the old "Here's a wheelchair; take it or leave it" attitude, made it his life's work to design the perfect wheelchair. "Wheelchairs, understand, are their legs," he explained.⁸

Over the years CIL received federal funding as a "demonstration program," and CIL's programs and philosophy have been copied worldwide. For years, thanks to CIL, curb cuts, relatively accessible transit, and other programs pushed by the center, Berkeley, and environs attracted many disabled people.

"People are literally flocking here from all over the country," CIL's housing director Jerry Woolf, said in the late '70s. "They are landing at the airport and calling us up. About once a month, someone pulls up outside in a taxi and says, 'Here I am!'"⁹