When Chauncey Starr walked through the door of the Radiation Laboratory at UC Berkeley (UCRL) in 1942, he stepped into a destiny he could never have imagined. Inside was the buzzing center of the world’s most closely guarded secret, the Manhattan Project, the feverish race to build an atomic weapon before the Nazis did. E. O. Lawrence, for whom the lab is now named (the Lawrence Berkeley National Laboratory), had invited Chauncey in. Lawrence, with an uncanny eye for talent, saw something in the young man that others, even Chauncey himself, had not realized was there—an ability to lead creative technical minds on an unrelenting march toward a single objective on a wartime schedule. Lawrence proved to be Chauncey’s most important mentor, and many of the attributes that Chauncey so admired in Lawrence became his own.

“My previous work had been either solo or with a few associates, and on a very small scale with little funds,” Chauncey said. “At UCRL, I was thrown into large-scale, 24-hour, 7-day, multiple-idea research, with performance, not cost, as the target. Lawrence presided over this creative chaos with a master’s touch—discarding failures, pushing what worked, making decisions intuitively, and inspiring with his confidence.”

Savvy Engineer
Chauncey brought something besides leadership potential that Lawrence urgently needed—the ability to bridge science and engineering. Chauncey had been trained in both and before the war had been an experimental scientist at Harvard and MIT, known to be ingenious at making his own equipment. He had been recruited in 1939 by the U.S. Navy’s Bureau of Ships to help it understand the shock waves produced by mines that were destroying British shipping. He had begun in typical fashion, building his own instruments to study the problem. Lawrence appreciated Starr’s engineering savvy and saw him as a distinctly innovative engineer in a sea of top physicists.

After Chauncey received initial training on the principles of the calutron electromagnetic racetrack for separating U-235, Lawrence sent him as his emissary and troubleshooter to Oak Ridge, Tennessee, where workers were refining weapons-grade uranium—and falling behind on production quotas. Chauncey found himself in charge of hundreds of gifted engineers experimenting with ways to improve production. As UCRL’s physicists advanced their knowledge, Chauncey’s team turned theory into reality. By 1945, Oak Ridge had separated enough U-235 to provide the critical mass for a weapon.

Inspirational Leader
Chauncey’s wartime experience seasoned and matured him and transformed him from an isolated scientist to an inspirational leader. Attitudes, approaches, and the principles of leadership that would guide Chauncey for the rest of his life had germinated and taken root during those three-plus eventful years. Large-scale R&D was now in his blood, and the way to ensure its success was as ingrained in him as it had been in Lawrence. A leader is not the boss, he liked to say in later years; a boss directs, a leader inspires. This requires humility, Chauncey liked to point out, “because you can’t do it alone and you can’t do it by delegation.” His rules for R&D were few: “Gather together the best people you can find and listen to their expertise. Know where you want them to go. Experiment with ideas and approaches, and realize that failure is a part of the equation, not something to get upset about or side-tracked by. As a leader, allow others to feel free to try and be free to fail. If an idea fails, just go on to the next thing.”

Central to this ethos was the integrity to call it as you find it, not as you wish it. As the Oak Ridge staff disbanded after the war, Chauncey went off to explore nuclear power concepts for North American Aviation (NAA). The Air Force had asked NAA to study the possibility of nuclear propulsion for intercontinental rockets and ramjets. At the end of two years, Chauncey’s team concluded that while nuclear propulsion was feasible, chemical rockets would be substantially better. He did what few military contractors are willing to do: he recommended cutting off funding for his own project.

Nuclear Pioneer
Chauncey then convinced NAA to turn his resources toward the greater promise of nuclear power. With this done, he gained

THE STORY IN BRIEF
Chauncey Starr (1912–2007) emerged from the pressure cooker of war as a seasoned and inspirational leader of large-scale R&D. He helped pioneer commercial nuclear power, created the interdisciplinary field of risk assessment, and invented EPRI, adapting a wartime model to a new age and a new set of R&D challenges. On the 100th anniversary of his birth—and the 40th of EPRI’s founding—the wisdom of his vision and the integrity of his approach have never been more apparent.
the attention, respect, and support of the new Atomic Energy Commission (AEC). It proved to be a fundamental career move into the frontiers of nuclear power, where the lessons of the nuclear rocket study remained paramount: pursue what works, not what doesn’t; pursue the truth no matter where it leads you. In the end, his thinking had crystallized into the important clarifying role science plays in society. Speaking to colleagues on “The Soul of EPRI” in 2002, he reminded the researchers gathered around him to remain steadfast in their work. “Our credibility is priceless. Like freedom, it requires continuous defense.”

NAA became North American Rockwell, and Chauncey assumed the presidency of its new Atomics International (AI) division, where he served for the next 20 years. The goal was to commercialize atomic power, and this effort prompted a competition among reactor designs that carried forward the momentum of the WWII weapons program. The principal issue was which of the many engineering paths to take. Debates ensued over the pros and cons of alternative combinations of fissionable fuels, moderators, and reactor configurations—the type of parallel-path R&D that appealed to Chauncey’s fertile and flexible mind.

During those pioneering days, when the potential for nuclear power seemed a gift to the world, President Eisenhower proposed the Atoms for Peace program in his 1953 address to the United Nations. He proposed that the United States make nuclear power available to all nations through small experimental research reactors for teaching and experimentation. At his 95th birthday celebration, Chauncey remembered his reaction at the time. “It was earthshaking in its nobility. I was so very proud of my country.” Chauncey had been asked to lead a five-person committee to decide whether the nation should, in fact, pursue Eisenhower’s magnanimous offer. After careful consideration—and along with one other committee member—he nevertheless voted against it for security reasons. In the end, the idea was vetoed by the Russians and faded away as the Cold War solidified.

By the mid-1960s, Chauncey’s leadership at AI was coming to an end. The AEC, faced with serious budget constraints, decided to concentrate its efforts on the already commercial light water reactor. To Chauncey’s enduring disappointment, it withdrew support from the heavy water organic cooled reactor that AI was bringing forward with the Canadians. As he stated in 1995 in Annual Review of Energy and the Environment, “I am strongly of the opinion that organic cooling would have opened the door to simpler and safer reactors...permitting inspection and maintenance while the reactor was operating. I believe the importance of the simplicity of man-machine interactions for economic and safe reactor operation has been underrated by the AEC and its successors, by the regulators, and by the industry.”

**Father of Risk Analysis**

The intertwined issues of safety, risk, and cost had become a central passion for Chauncey by 1966, when he became dean of the School of Engineering and Applied Science at UCLA. A paradox intrigued him: the mismatch between actual risk and perceived risk of large-scale technology in society. He noted that society had an odd tolerance for self-generated risk and a distinct intolerance for risks imposed by others. He noted that people would accept voluntary risks that were 1,000 times greater than those imposed from the outside. “We are loath to let others do unto us what we happily do to ourselves,” he observed. He quantified risk in new ways, and his seminal paper in Science in 1969 served as the foundation for the new interdisciplinary field of risk analysis.

This guiding passion for interdisciplinary study harked back to his wartime experience. “I believed then, as I do now,” he said, “that some of the most fruitful frontiers of engineering are interdisciplinary...[and that] these activities have a difficult time in the discipline-focused, professionally accredited engineering curricula.” As a result, he introduced a new, interdisciplinary degree program in environmental engi-
neering at UCLA and, working with the dean of medicine, created the school’s Institute of Medical Engineering.

Founder of EPRI
When asked at his 95th birthday celebration to identify the world’s greatest technological achievements during his lifetime, he shook his head, pausing, his eyes alight with the possibilities. Finally, he said the two that stood out above all others were the electrification of the world and the communications revolution spawned by electricity, which flattened the world.

It was the enormous impact of electricity on society that led him to respond with such clarity and breadth of vision to the committee responsible for creating a new industry-wide R&D organization for electric power in 1972. The electricity sector was under the gun—a one-year political deadline imposed by the Senate Commerce Committee. This deadline appealed to Chauncey’s wartime can-do spirit with a scale of interdisciplinary R&D that he could only dream about. The committee wanted him for reasons of expediency, and he wanted the job for its potential to serve society. What other industry was this important to the world? What other industry had to plan in terms of decades? What other industry could break the cycle of poverty in the developing world? “A dinner cooked over a fire wastes 98% of its energy,” he pointed out. “The same fuel used to generate electricity can cook 15 dinners.”

The challenge was simply too great, and the possibilities were too profound, to decline. He’d give up his comfortable roost in academia and culminate his career with a dream script he could write himself. OK, he said to the new board, he’d accept, provided he could set up EPRI to fulfill its broader social purpose, bring in the best people, and run it his way, unimpeded, for five years.

It wasn’t wartime, so Chauncey could not simply conscript the best and the brightest to come to Palo Alto. But he could do the next best thing—hire them through R&D contracts and put them together into unique combinations to get a job done. For example, Carnegie Mellon researchers could be joined with an engineering team from Stone and Webster, merging the specialized expertise of the two. It was a wartime model adapted for a new age. Chauncey established EPRI as the first industry wide virtual R&D organization. The intent was flexibility and speed. If one path doesn’t work, go to the next. When cold fusion hit the headlines, a team was set up the next day at Texas A&M to investigate. When the experiment couldn’t be replicated, EPRI disbanded the team.

No Stopping for Retirement
Chauncey formally retired at 65 as required, and then forged ahead informally at EPRI five days a week for the next 30 years. In 2007, EPRI hosted his 95th birthday celebration, where he was asked about his ongoing work. He mentioned three or four projects, including a continental super grid where hydrogen and electricity would be delivered through the same conduit. People who knew him from the early days were there in tribute. He waved away their accolades. He already had enough awards and tributes to fill a small museum, but what mattered were the work, the ideas, the creative ferment, the people, and the nobility of purpose. Young people there, about the same age Chauncey had been when Lawrence summoned him, admired the legend who was still alive and kicking, as feisty and gentle as a beloved grandfather, and contemptuous of rules that got in the way. His advice to them: “Disregard all organization charts.” Truth should reign, he meant. Service to your country, to humanity, is your goal. He was an exemplary man, one of the greats of the greatest generation.

The day after this birthday celebration, he got up, had breakfast, then took a nap from which he never awoke. His office was stacked to the ceiling with unfinished work. The man never stopped.

This article was written by Brent Barker.