Chicago connections abundant in 'Dr. Atomic'

By Sid Smith | Tribune arts critic December 9, 2007

The date Dec. 2, 1942, in Chicago was a dark, cold day, to borrow from W.H. Auden's great elegy on Yeats -- arctic in temperature and deadly in significance.

Ace researchers gathered in a squash court beneath the west stands of Stagg Field, the University of Chicago's abandoned football field along Ellis Avenue.

Enrico Fermi and his team, assembled to work in the Chicago branch of the Manhattan Project, achieved the first controlled nuclear chain reaction. Their atomic pile, made of graphite blocks, uranium and cadmium control rods, produced the reaction in midafternoon, lasting for 28 minutes.

"We gathered on a balcony, about 10 feet above the floor," Fermi said later of that morning. "Beneath us was a young scientist, George Weil, whose duty it was to handle the last control rod that was holding the reaction in check."

Meanwhile, a "liquid control squad" stood by ready to flood the pile with a cadmium salt solution if the control rods failed. Just before noon, a loud clap from the machine signaled that the safety point had been set too low -- some described the noise as a thunder clap. Fermi wryly said later, "It seemed a good time to eat lunch."

A couple of hours passed before the experiment resumed. At the crucial moment, Fermi, calm and inscrutable throughout, suddenly smiled and closed his slide rule. "The reaction is self-sustaining." Someone produced a bottle of Chianti, which was poured into cups and sipped without any toasts. "The event was not spectacular," Fermi later put it. "No fuses burned, no lights flashed."

But the atomic era had arrived.

"If there hadn't been a successful experiment under those west stands, there would not have been any atomic bomb," says Roger Hildebrand, who also worked in war research and knew Fermi as a colleague at the U. of C. in the early 1950s.

"Fermi was incredibly bright, very gracious, very self-effacing," Hildebrand recalls. "He would give others credit for things they thought of long after he did. He was also an avid sportsman. If we went for a hike, he'd outhike us all."

Hildebrand, 85, currently the Samuel K. Allison distinguished service professor emeritus in the university's department of physics, the department of astronomy and astrophysics and the Enrico Fermi Institute, knew other key Chicago-area players involved with nuclear research. A character based on Robert R. Wilson (called simply Robert in the opera) is portrayed as a young man of conscience concerned about the moral implications of nuclear weaponry.

Hildebrand knew Wilson, who later served as director of the Fermi National Accelerator Laboratory in Batavia, and while he doesn't recall specific discussions on the bomb's moral issues, "that would fit what I knew of his character. He was a sensitive guy with artistic interests and a sculptor."

Another figure in the opera is Edward Teller, who worked in Chicago before moving on to Los Alamos, N.M., and later earning the title "father of the hydrogen bomb."

"He was a fairly dominating person," Hildebrand recalls. "Unlike Fermi, he was interested in pursuing more violent weapons after the war. He sincerely believed it was the only way to make the world safe."

At the same time Fermi was under the Stagg Field stands, Glenn Seaborg led a team of scientists nearby working on chemical processes to develop plutonium in quantity. The research led to the bomb dropped on Aug. 9, 1945, on Nagasaki, Japan, three days after a uranium bomb blasted Hiroshima.

Henry Frisch, currently a professor of physics at the U. of C. and Fermi Institute, was born in Los Alamos in 1944 to parents who were part of the team there. His late father, David, witnessed the test, and his mother, Rose, a distinguished biologist, worked in the blood lab with Kitty, wife of Manhattan Project leader J. Robert Oppenheimer.

Oppenheimer once made young Frisch a kite. Today, Frisch is not only a physicist himself but an eloquent analyst of the grave dilemma posed by nuclear weaponry.

"How do we get mankind to understand that this is a new realm and that, left to its own devices, mankind can annihilate itself?" he said in his office less than a block from where Fermi worked. "We're destined for catastrophic changes, unless we wake up, and I'm pessimistic we will. It's just not that hard to build a bomb, once you obtain uranium-235."

Frisch is on the board of directors of the Bulletin of the Atomic Scientists, a magazine launched here in 1945 by a group including co-founder Eugene Rabinowitch, who had been on the Manhattan Project at the U. of C. and later worked at the University of Illinois at Urbana-Champaign. In its first issue, the scientists appealed "to the American people to work unceasingly for the establishment of international control of atomic weapons, as a first step toward permanent peace."

The magazine is still published bimonthly, its offices relocated from Hyde Park to downtown. In 1947, the bulletin inaugurated its famous doomsday clock, a metaphoric warning about how close we appear to be to nuclear Armageddon, a figure determined by the bulletin's board of directors.

During the Cold War, the clock got to five minutes to midnight, or doom, pulling back to a quarter to midnight after the Soviet collapse. Now we're back to five minutes till, because of developments involving Pakistan, North Korea and Iran.

"The bulletin came about because scientists here who worked on the Manhattan Project were worried about the future of humanity," says Jonus Siegel, its current editor. "Chicago has a unique position when it comes to the Manhattan Project, not just as a center for science, but as a keen ethical and activist center as well."

In Hyde Park, the Stagg Field stands are gone, replaced by the Regenstein Library. But an outdoor bronze sculpture by renowned English artist Henry Moore marks the spot above the old squash court.

"My office is just across Ellis Avenue, and out of my window, day after day, year after year, I see busloads of tourists stopping by," Hildebrand said in an address to the University of Chicago Library Society in 1992, marking the 50th anniversary of the chain reaction.

"Often, they are Japanese tourists. They get out and take pictures of each other standing by the sculpture or the plaque that marks it as a National Historic site. I see classes of schoolchildren walking to the sculpture. I see photographers trying to get a shot without tourists.

"All of these people know that something important happened there."

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sismith@tribune.com