"Holy Ground in the True Modern Sense"

Pier Luigi Nervi's Unbuilt Fermi Memorial at the University of Chicago

THOMAS LESLIE

The first self-sustaining man-made nuclear reaction took place on December 2, 1942, in improbable surroundings. With secrecy a top priority in wartime, a team of physicists and technicians led by Enrico Fermi built the first atomic pile in an abandoned squash court under the stands of Stagg Field, the University of Chicago's former football stadium. The pile—never completed but instead rushed into criticality after less than a month of construction—ran for twenty-eight minutes, producing just enough energy to confirm that atomic fission—one of the greatest scientific achievements of the century—had occurred.[1]

There was, however, little celebration of the "Chicago experimental pile," also known as CP-1. Aware of fission's potential for military use, Fermi and his team had sworn self-censorship to their government minders. Despite the manufacture and transportation of uranium from sites in Tennessee, Iowa, and Washington, few outside of the laboratory or the National Defense Research Committee knew of the pile's existence until the end of the war.[2] The pile was disassembled and moved to what would become Argonne National Laboratories, west of Chicago. After directing its reconstruction, Fermi joined Robert Oppenheimer's staff in Los Alamos in 1944 and saw the first atomic bomb test in New Mexico in July 1945. He returned to the University of Chicago and Argonne in 1946. Fermi died of stomach cancer just eight years later, at the age of fifty-three.[3]

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[1]For the definitive history of CP-1, see Fermi, "The Development of the First Chain Reacting Pile," *Proceedings of the American Philosophical Society* 90 (1946): 20–24.

[2]Roy Gibbons, "Plan Ceremony to Mark Birth of Atomic Era," *Chicago Sunday Tribune,* Nov. 30, 1952, pt. 1, 29.

[3]"Fermi's Death Shocks Atomic Science World," *Chicago Daily Tribune,* Nov. 29, 1954, pt. 6, 5.

Thomas Leslie is Morrill Professor and the Pickard Chilton Professor in Architecture at Iowa State University. Leslie has degrees from the University of Illinois at Urbana-Champaign and Columbia University, and was an associate with Norman Foster and Partners in London prior to teaching. He is the author of *Louis I. Kahn: Building Art, Building Science* (2005), *Chicago Skyscrapers, 1871–1934* (2013), and *Beauty's Rigor: Patterns of Production in the Work of Pier Luigi Nervi* (forthcoming). In 2013–2014 Leslie was the Booth Family Fellow in Historic Preservation at the American Academy in Rome.

Fermi's name has been linked with Chicago ever since word of his achievement became public, but he had been in the city only briefly before CP-1's construction.[4] Born in Rome, he was educated at the *Scuola Superiore Normale* in Pisa and made Chair of the new Faculty of Theoretical Physics at the University of Rome when he was just twenty-five years old. The University's faith in Fermi was validated by his subsequent research on the neutron's relationship to radioactivity. That work earned him the Nobel Prize in 1938, and the Stockholm ceremony gave Fermi and his wife, Laura, an opportunity to escape from Italy's increasingly corrosive fascist state. Fermi joined the faculty at Columbia University and was soon called upon to work with Arthur Compton in the University of Chicago's metallurgical laboratory.[5]

Fermi's death in 1954 came just after the ten-year anniversary of the first chain reaction and at the height of the atom's hold over American culture. Atomic warfare was an ever-present terror but the country's optimism about "practically free" atomic energy was abundant. That year saw the first nuclear-powered submarine, the USS *Nautilus,* and the first operational nuclear power plant, in Obninsk, USSR. The realities of such plants' construction costs and the potential for nuclear accidents lay far in the future; Eisenhower's "Atoms for Peace" speech in 1953 and the nuclear energy programs that followed provided a progressive counterpoint to the terrifying developments of the hydrogen bomb. *Castle Bravo,* the United States' largest nuclear test, was detonated on Bikini Atoll, Marshall Islands, on March 1, 1954, just months before Fermi's death.[6]

The Fort Dearborn Plan

Fermi's achievement was unmarked in Chicago at the time of his death. CP-1's dismantling left the pile's initial site unused, and Stagg Field was abandoned with no trace of Fermi's achievement. Embarrassed that such an important moment in the city's history had been ignored, in 1950 Chicago's mayor, Thomas Kennelly, proposed a Fermi memorial as part of an urban renewal scheme for a new Civic Center. The so-called Fort Dearborn Plan, which would have redeveloped 146 acres just north of the Chicago River, was to incorporate a new City Hall in addition to commercial and residential districts.[7] While the plan was Kennelly's vision, Richard J. Daley's ascent in 1954 brought with it a new brand of ethnic

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[4]Gibbons, "U. of C. Reveals Story of Work on Atomic Bomb," ibid., Aug. 17, 1945, pt. 1, 3.

[5]"Enrico Fermi Dead at 53: Architect of Atomic Bomb," *New York Times,* Nov. 29, 1954, 1.

[6]See Richard Rhodes, *Dark Sun: The Making of the Hydrogen Bomb* (New York: Simon & Schuster, 1995).

[7]See *Enrico Fermi Memorial International Architectural Competition* (Chicago, 1956) (copy at Chicago History Museum); Thomas Buck, "Fort Dearborn Plan Changes are Proposed," *Chicago Daily Tribune,* July 16, 1954, pt. 1, 7.

politics. On January 19, 1956, Daley announced a $15,000 architectural competition for a Fermi memorial to be incorporated into the new Civic Center.[8] Daley made the announcement on behalf of the Chicago Joint Civic Committee of Italian Americans, touting the new memorial as an opportunity to honor one of the city's most famous adopted sons.[9]

Such a commemoration was also fraught with ethnic politics, for Italian-American support had been important to Daley's political rise. While smaller than other major politically linked groups, Italian Americans had been natural allies with Daley's Irish bloc through the turbulent racial unrest of the 1910s, linked both by unease at the growth of the South Side's African American population and by parish Catholicism.[10] Those links were strong enough to make Daley a favorite candidate of the Italian community, who supported him in his political coup to become the Eleventh Ward Committeeman in 1947. When Daley ran for mayor in 1955 he enjoyed overwhelming support of the First Ward, long the locus of Italian-American's political strength in the city.[11] But that concentration faced both scandal and dispersal. The First Ward was also notoriously the center of organized crime in the city, making it an important but embarrassing bastion for Daley's organization. More critically, Italian Americans were leading the flight from the South Side to the suburbs in the face of growing African American emigration to the city. From a peak of nearly seventy-four thousand in 1930, their population in Chicago declined as second and third generations gained middle-class status and fled traditional neighborhoods for suburbs such as Cicero. As families left they took votes with them, a problem that Daley faced throughout his administration and one that inspired him and his allies to build strategically, revitalizing the Loop as a base of commercial power, and doing what they could to sculpt racial breakwaters out of public housing, interstates, and civic construction that would passively strengthen the city's segregationist tendencies and address concerns of white voters. On its face, the Fort Dearborn Plan would have played into that strategy, clearing a blighted district north of the Loop while establishing a greater business footprint downtown and providing housing that would inevitably be pitched to white-collar office workers.[12]

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[8]"Plan Architecture Contest to Design Memorial to Fermi," *Chicago Daily Tribune*, Jan. 20, 1956, pt. 1, 2.

[9]"$10,000 Offered for Design of Fermi Building," ibid., Aug. 30, 1956, pt. 3, 6.

[10]See Adam Cohen and Elizabeth Taylor, *American Pharaoh: Mayor Richard J. Daley: His Battle for Chicago and the Nation* (Boston: Little, Brown, 2000), 102.

[11]Ibid., 191.

[12]Ibid., 216.

The program for the memorial that was to grace the heart of the Fort Dearborn Plan was simple: a museum of Fermi's personal effects and a theater designed for a continuously looped film on his life and work.[13] The competition drew over three hundred entries from around the world; "from both sides of the iron curtain."[14] The jury was also international: Lancelot Law White, a Scottish physicist involved in the development of the jet engine, joined architects Mies van der Rohe, Jose Luis Sert, and Gordon Bunshaft on the panel, blending science and design. Standing between physics and architecture, and representing Fermi's home country on the jury, was Italian engineer and *constructeur* Pier Luigi Nervi.[15]

Nervi would become well known over the next four years as his projects for the 1960 Olympics in Rome attracted worldwide press, but in 1957 he still required some introduction in America. Born in 1891, Nervi received degrees in engineering from the University of Bologna, then an important center of concrete research. Working first for Attillo Muggia, one of his professors at Bologna, and then on his own with contracting partners Rodolfo Nebbiosi and Giovanni Bartoli, Nervi formed an unusual practice that combined structural design and engineering with fabrication and construction; Nervi and Nebbiosi specialized in efficient factory and commercial buildings, but after 1932 Nervi and Bartoli won commissions based on inventive prefabrication and concrete forming techniques. Their hangars for the Italian Air Force completed between 1935 and 1942 reflected the nationalist economic policies of the fascist regime, finding new economies in structural form and in prefabricated truss sections that minimized the amount of imported steel necessary to strengthen the concrete roofs. After the war, Nervi and Bartoli perfected the design and production of thin-shell *ferrocemento* elements. That technique took advantage of the postwar Italian labor economy by breaking down the construction process into simple, repetitive tasks that could be performed by unskilled workers. Nervi and Bartoli's miraculous construction of the seventy-meter span *Torino Esposizione* Hall "B" in just eight months over the

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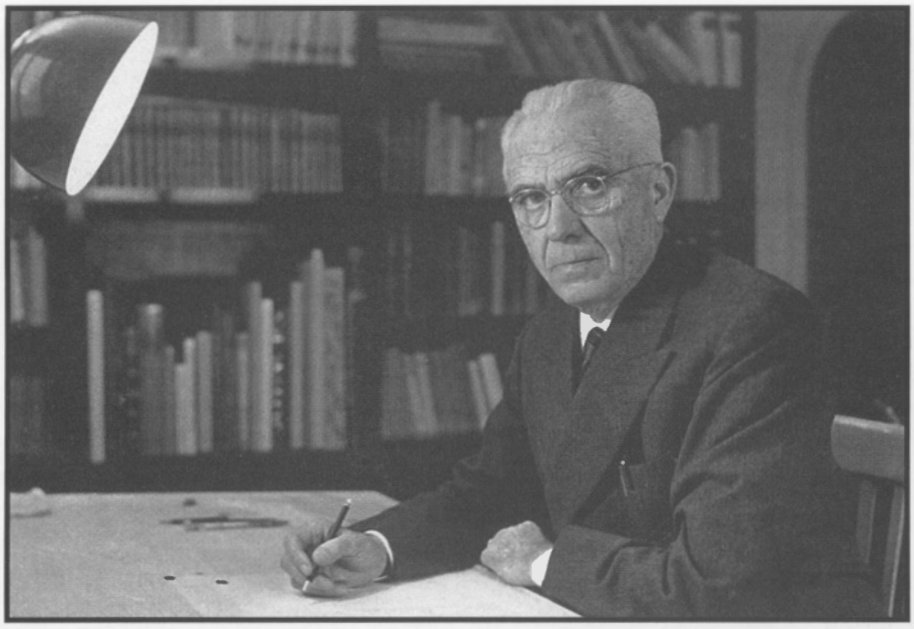
[13]"The Fermi Memorial Pavilion will form a focal and integral part of this complex. It will be used by the general public as well as by the surrounding institutions. The site indicated on the drawings is 210' by 210' and unlimited in the vertical dimension. The architecture of the Pavilion is in no way restricted. The foregoing is background information describing the conditions that will surround the site. It in no way implies that the Memorial Pavilion must continue this pattern either structurally or architecturally, but it is important that the Pavilion becomes integrated with the circulation and activity of the Institutional Center." See *Enrico Fermi Memorial International Architectural Competition.*

[14]"300 in Contest for Building to Honor Fermi," *Chicago Daily Tribune,* Nov. 5, 1956, pt. 2, 6. Among the competitors was Louis Kahn and August Komendant, the first collaboration between the two on a scheme that has been entirely lost. See August E. Komendant, *18 Years with Architect Louis I. Kahn* (Englewood, N.J.: Aloray, 1975).

[15]"Begin Judging Fermi Pavilion Designs Today," *Chicago Daily Tribune,* Mar. 15, 1957, pt. 1, 11.



PIER LUIGI NERVI

winter of 1947–1948 assured their reputation as brilliant designers and builders, and further long-span commissions followed for exposition halls, factories, transport terminals, and sports facilities.[16]

On March 22, 1957, the Chicago Junior Chamber of Commerce and the Chicago Joint Civic Committee of Italian Americans announced that the jury, with Nervi concurring, had selected the design of Reginald C. Knight, a Columbia and Harvard-educated architect who had taught at MIT before beginning a design career in Sarasota, Florida. "A one story square block building with a glowing white roof for people to walk on while music emanates from 48 six story chimney like tubular bells," Knight's scheme was designed to connect the lowered street and elevated concourse levels of the Civic Center—a complex of Miesian office buildings and a large plaza called simply the "Institutional Center."[17] But despite the acclaim for Knight's scheme from the jury and the press and the top prize of $5,000, the project evaporated as plans for the Fort Dearborn project evolved in the Daley administration.[18]

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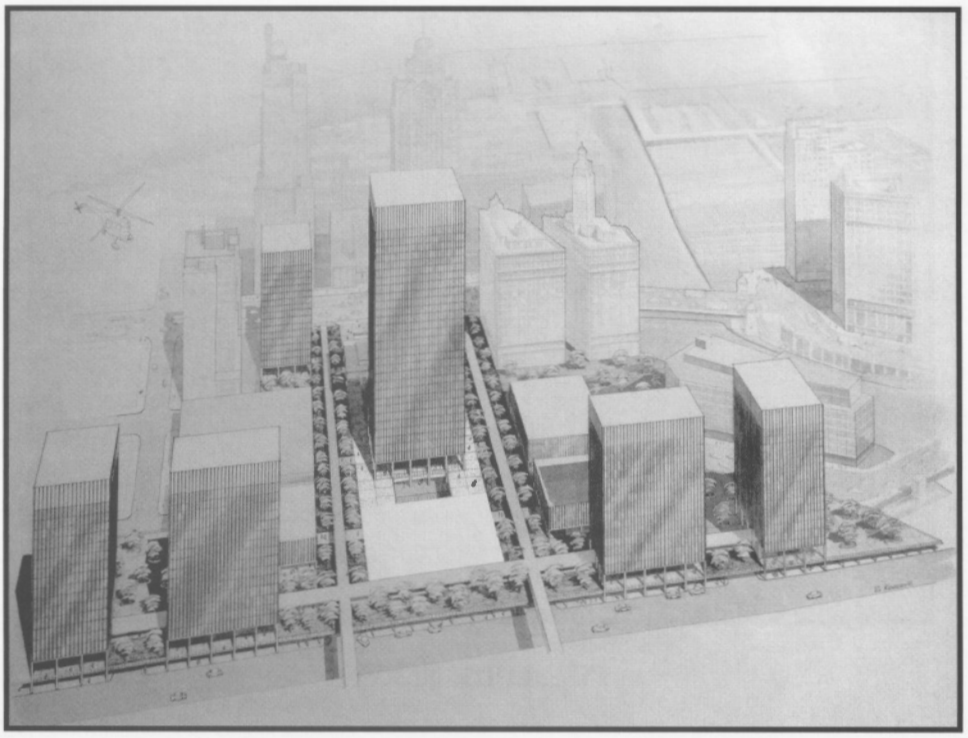
[16]Enrico Pellegrini, "Strutture [Torino Esposizione]," *Domus* 231 (June 1948): 8–9.

[17]"Architecture for the Ear," *Time,* Apr. 1, 1957, 76. See also "Knight Selected to Do Project Honoring Fermi," *Sarasota Journal,* Mar. 29, 1957, 1; "Unveil Model of Fermi Hall Prize Design," *Chicago Daily Tribune,* Mar. 22, 1957, pt. 1, 13. Knight was known as part of the "Sarasota School," whose best-known work was with Victor Lundy on a house for artist Ben Stahl, the project that actually brought Lundy to Florida from New York.

[18]"Unveil Model of Fermi Hall Prize Design." For the dissolution of the Fort Dearborn Project, see Thomas Buck, "Fort Dearborn Project Faces Vital Decision," *Chicago Daily Tribune,* July 6, 1958, 24.



A plan for a new civic center—also know as the Fort Dearborn Plan—was introduced in 1950. It was to include a memorial to Enrico Fermi. It was never built.

Knight's scheme and the entire Fort Dearborn project were doomed by their urban and political contexts. Fort Dearborn had been Kennelly's vision, planned by Nathaniel Owings of Skidmore, Owings, and Merrill (SOM), and funded by the Marshall Field Estate. But it foresaw the razing of Chicago's City Hall and the abandonment of the Loop by the city government for an otherwise commercial enterprise to the north—and in the Twenty-First Ward, not the First. A competing plan based on Burnham and Bennett's scheme for a grand civic center west of the main business center remained a powerful vision for neighborhoods and property owners in that more blighted area. Daley's enthusiasm for Fort Dearborn waned in favor of yet a third, more politically strategic central vision that would re-invigorate the Loop by concentrating city, state, and federal government offices around the existing City Hall, strengthening the First Ward.[19] By July 1957 Daley had appointed a Plan Commission to prepare a comprehensive vision for the city, throwing the Fort Dearborn project and its components—including the Fermi Memorial—into doubt.[20] Pleas from the Marshall Field Estate and from property

[19]Clayton Kirkpatrick, "Outline Vast Civic Center!" *Chicago Daily Tribune,* Mar. 17, 1954, pt. 1, 1. For Daley's counter-plan, see the similarly punctuated Buck, "22 Year Plan: A New Face for Chicago!" ibid., Aug. 23, 1958, pt. 1, 1.

[20]Buck, "Government Center Project Urged for Fort Dearborn Project," ibid., July 17, 1957, pt. 1, 3.

owners on behalf of the Fort Dearborn project soon fell victim to Daley's politically charged vision for a denser Loop. His plan, announced in August 1958, reversed the diffusing impulse of Kennelly's scheme, concentrating government offices within, rather than adjacent to, the downtown district. Knight's design, Fermi's Memorial, and Nervi's first tentative foray into Chicago were lost in Daley's $1.5 billion vision. Daley owed his Italian American supporters a memorial.[21]

Hyde Park

The fifteenth anniversary of CP-1 in 1957 also passed without a physical monument to Fermi's achievement. While the University of Chicago renamed its Institute for Nuclear Studies after him in 1955, it also demolished Stagg Field in December 1958, just four months after the demise of the Fort Dearborn project. A plaque that had been placed on the exterior wall of the stands under which Fermi worked was saved and "mounted as a memorial on the site," but as the grounds were converted to an athletic field there was no physical structure to represent the site's history and the plaque languished on a simple wire fence.[22] Five years later surviving scientists gathered to mark the pile's twentieth anniversary and remarked on the embarrassment of the site: "Bare ground, neatly raked, and a border of frost-bitten flowers outlined the area." Under the leadership of Manhattan Project veteran Samuel Allison they proposed that a "small building be constructed at the site" that "would house a replica of the original Chicago atomic pile" along with an exhibit hall and a conference center.[23] University of Chicago president George Wells Beadle agreed. He suggested that "a structure nobly representative of the achievement" could perhaps be dedicated on the campus in time for CP-1's twenty-fifth anniversary in 1967.[24] Matching the enthusiasm of the scientists for the historic moment, however, was a small group of protesters that met the delegation on the site, sporting banners that "urged the scientists to devote their efforts to peace and criticized them for their part in developing atomic energy."[25]

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[21]Buck, "22 Year Plan."

[22]"Only Sand Lot Remains at Atomic Age Birth Site," *Chicago Sunday Tribune,* Dec. 7, 1958, pt. 3, 2.

[23]Howard James, "32 Pioneers Relive Atom Age's Birth," ibid., Dec. 2, 1962, pt. 1, 5, 1.

[24]Ibid., 5.

[25]Ibid.

Just weeks later a Chicago visit by Italian Premier Amintore Fanfani provided renewed impetus for a memorial. After meeting with Beadle and touring the empty Stagg Field site with Laura Fermi, Fanfani announced that he would ask the Italian parliament to fund a competition for a commemorative sculpture and twin research centers in Chicago and Italy that would further nuclear research. "It is hoped that scholars from all over the free world will be able to use the facilities of both centers to be made available thru the generosity of the people of Italy and their friends in the United States in memorial to Fermi, the Christopher Columbus of the 20th century," Fanfani announced in prepared remarks as he left the city, noting the political and cultural symbol of the Italian American community.[26] Daley, by Fanfani's side throughout the visit, remained keen to maintain Italian votes. "I had the fleeting impression that Mayor Daley was trying to get me to vote for him," Fanfani later remarked. Daley's administration signed on to the project as way to fulfill the lost promise of the Fort Dearborn project, but the timing suggests a more political motive. Chicago's Italian community had been stung by Daley's decision in 1961 to raze a longstanding Italian neighborhood for the bulwark-like urban redevelopment of the University of Illinois Circle Campus.[27] During protests Daley publicly noted that the neighborhood—and Italian American voters throughout the city and suburbs—had become less dependably Democratic than ever.[28]

By November 1963 the University had conducted aerial surveys of the site and had appointed William H. McNeill, Chair of the History Department, I. W. Colburn of the University Architect's office, and Harold Haydon, an Associate Professor of Art, as an executive committee charged with contacting three international designers.[29] McNeill sent letters soliciting ideas to New York-based sculptor Jacques Lipchitz, to Parisian architect Le Corbusier, and to Nervi. Le Corbusier declined the invitation due to poor health.[30] Lipchitz visited the site at once, aided by connections with the Walker Art Center in Minneapolis, but the visit did not go well, leaving the committee convinced that the monument required an architect, not a sculptor.[31] That left Nervi, to whom the executive committee paid a visit in Rome in December.[32]

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[26]"Reveal U. of C., Italy Science Center Plans," ibid., Jan. 20, 1963, pt. 1, 25.

[27]Percy Wood, "Fanfani Sees Strong Link in U.S.-Italy Bond," *Chicago Daily Tribune,* Jan. 19, 1963, pt. 1, 8.

[28]Cohen and Taylor, *American Pharaoh,* 232.

[29]F10711 and F10712, in Folder P5516, "Università di Chicago," Pier Luigi Nervi Collection, Centro Archivi Architettura di MAXXI, Rome, Italy (hereafter cited as Nervi Collection).

[30]Le Corbusier to William H. McNeill, Dec. 3, 1963, Box 1, William H. McNeill Papers, Special Collections Research Center, University of Chicago Library.

[31]McNeill to Jacques Lipchitz, Nov. 22, 1963, ibid. McNeill's first notes on Nervi make clear that the engineer, in apparent contrast to Lipchitz, had "no apparent artistic temperament." McNeill, notes from meeting with Nervi, Dec. 21, 1963, ibid.

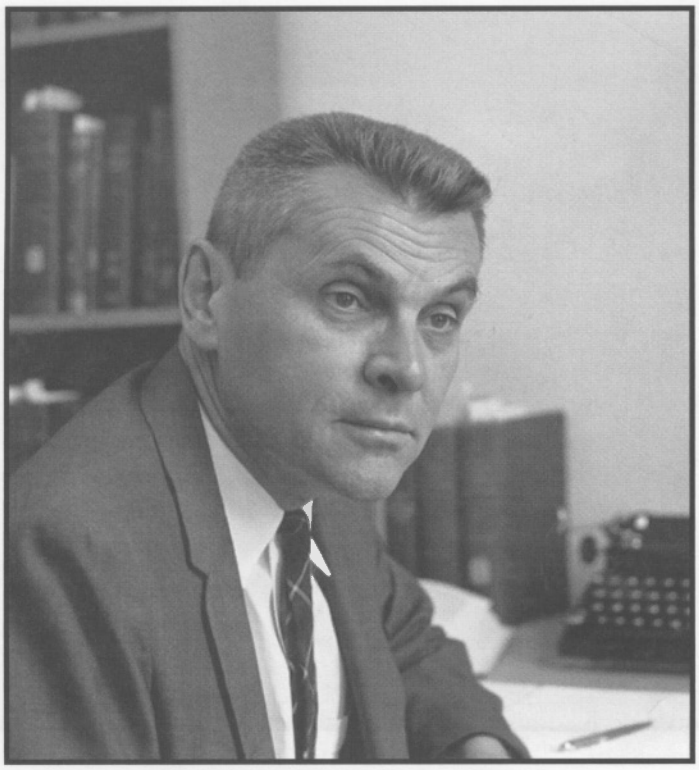
[32]Nervi to McNeill, Dec. 27, 1963, in Folder P5516, "Università di Chicago," Nervi Collection.

LAURA AND ENRICO FERMI

McNeill's invitation to Nervi on November 15, 1963, evoked the significance of the project:

> We would like to talk to you about the erection of an architectural monument on the site of the first controlled release of atomic energy. This occurred on the campus of the University of Chicago 2 Dec 1942. Plans are under way for the creation of a suitable monumental and symbolic memorial to this event—if possible on the occasion of its 25th anniversary, i.e. 2 Dec. 1967. . . . Properly carried through, the monument can become a place of pilgrimage for all the world; holy ground in the true modern sense; a monument to man's triumphs, charged with high hope and profound fear, just as every triumphant breakthrough has always been. . . . [We are] prepared to call at your convenience, to explore the matter further. Are you interested?[33]

[33]McNeill to Nervi, Nov. 15, 1963, in ibid.



WILLIAM H. MCNEILL

"The erection of a monument symbolizing 'the high hope and profound fear' so tightly correlated with atomic energy, is certainly one of the most exciting problems which may confront architects in the present age," Nervi responded.[34] McNeill, Haydon, and Colburn flew to Rome in December, meeting to discuss the project in Nervi's office on the nineteenth. While "a bit nervous," Nervi "made a very good impression" and seemed "eager to do the job." He confessed to being surprised that the Fort Dearborn project had not gone ahead—no one, apparently, had informed him of the scheme's demise. But he also believed that the "ideas of that competition [had all been] very banal."[35] Nervi instead promised something "soaring," but felt that his *métier*, concrete, might not do justice to such a monumental structure. He suggested "stone, granite [or] marble," which Colburn felt was "surprising, a little alarming, too."[36] Nervi also proposed Henry Moore as a collaborating sculptor based on his contribution to the UNESCO headquarters in Paris, which Nervi had designed with Marcel Breuer. McNeill visited Moore on

[34]Nervi to McNeill, Nov. 30, 1963, in ibid.
[35]McNeill, notes from meeting of Dec. 21, 1963, with Nervi, Box 1, McNeill Papers.
[36]Ibid.

his return from Rome. Beadle had by that point announced plans for a memorial on a 250-foot-by-150-foot site along Ellis Avenue between Fifty-Sixth and Fifty-Seventh streets, where the squash court and stands had stood, without specific reference to either a sculpture or a conference center.[37] Nervi said he would need "a few weeks" before responding with a definitive idea. By February Colburn had convinced the committee that Nervi "should work in concrete, since this is the material with which he achieved his finest expression," and that the structure should "be an open pavilion, since enclosing walls tend to obscure the glory of Nervi's structures."[38]

In the six years since the initial, abortive Fort Dearborn project, Nervi and his "glorious" structures had enjoyed a rapid rise to international stardom. While his work through the 1950s had gained attention in the engineering and architectural press, his buildings for the 1960 Olympics—two arenas, an outdoor stadium, and a viaduct providing access to the games' main campus—earned him global press coverage. A tribute in *Time* in 1957 noted that Nervi's "soaring exhibition halls, breath-taking airplane hangars, utilitarian salt depots and tobacco warehouses are hailed by many as among the handsomest structures built in Europe in this century," and described his *oeuvre* as "Poetry in Concrete." In addition to being a skilled designer and constructor, Nervi was an accomplished businessman and publicist, and he played along with the press' fascination with his buildings' economy and gymnastic structural grace. "Beauty does not come from decorative effects, but from structural coherence," he explained to *Time*'s reporter. "In the absence of good taste, economy is the best incentive for art."[39] Nervi had embraced financial, material, and site constraints throughout his career; for him they were not impediments, but rather positive forces that distilled his designs down to their essentials. The results were clear presentations of structural principles, construction patterns, and material qualities that are uncanny in their lucidity. They were also exemplars of Italian design culture at the peak of the country's international reputation for technically fluent style. The so-called "Italian Miracle," a period of post-war economic growth based on the investment of the Marshall Plan, a robust supply of labor, and global demand for the country's manufactured and media products, was highlighted by its global acceptance as a new capital of fashion and culture. Milan and Rome produced clothing that rivaled French fashion houses, but the country's automotive industry

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[37]"U.C. Site of 1st A-Reaction to be Memorial," *Chicago Tribune*, Dec. 2, 1963, sec. 1C, 15. This announcement coincided with the award of the $50,000 Enrico Fermi award to Robert Oppenheimer, an event that represented Oppenheimer's vindication of charges that he was a 'security risk.' See William L. Laurence, "First Atomic Fire: Award to Oppenheimer Marks the Birthday of the Atomic Age," *New York Times*, Dec. 1, 1963, 251.

[38]I. W. Colburn to McNeill, Feb. 27, 1964, Box 1, McNeill Papers.

[39]"Poetry in Concrete," *Time*, Nov. 11, 1957, 102–5.

produced globally recognized performance and design, led by stylist Pinin Farina's styling for Fiat and Ferrari. Product design by firms like Olivetti were matched by elegant designs by architects such as Gio Ponti, and the Italian film industry produced some of the most critically acclaimed, visually lush cinema of the postwar generation. *Made in Italy* became a synonym for robust, efficient, and elegant products at all scales, and Nervi's buildings were some of the most prominent symbols created by the "Miracle": his buildings served as the backdrop for key scenes in Italian films such as Federico Fellini's 1953 *I Vitelloni* (The Kursaal Casino at Ostia) and Michelangelo Antonioni's 1962 *La Notte* (the Pirelli Tower, designed with Gio Ponti) and *L'Eclisse* (the Palazzetto dello Sport, a symbol of the 1960 Rome Olympics).[40]

Press acclaim for Nervi went deeper than stunning visuals, though. Winthrop Sargeant's lengthy profile of Nervi in the *New Yorker* in anticipation of Rome's Olympics in June 1960 began with typical praise for the "lacy . . . astounding grace and breathtaking span" that his buildings represented: "Nowhere in his [Nervi's] work does concrete seem unwieldy or massive, and nowhere is a concrete beam or arch an iota heavier than it needs to be in order to carry the stress imposed on it. The result is as exciting, in its way, as a soprano's perfectly placed high C or an athlete's powerful, totally controlled broad jump."[41]

Sargeant's piece moved beyond those evocative descriptions, however, noting that the structures' "engineering virtuosity" was balanced by "serenity" and "monumentality."[42] Nervi explained his designs' beauty as a result of their fidelity to and expression of structural and mathematical principles, but structure was an ideal language that had to be realized through thoughtful construction. "Mathematical calculations . . . only partly coincide with the laws of constructed form, which mainly follow a process of intuition rather than logic," he explained. For many critics, that approach infused Nervi's buildings with monumental atmosphere and a warmer, personal sensibility. A designer who could transform principles of physics into captivating works of architecture was a naturally fascinating figure in 1960, just a year after C. P. Snow's essay *The Two Cultures* was published and as postwar scientific optimism reached a crescendo. Continued progress in nuclear physics, the Salk vaccine, and the burgeoning space race all suggested unlimited frontiers in science and technology, and Nervi's elegant, patterned roofs fit Snow's call for works that bridged the sciences and the humanities. An Italian who could celebrate physical law with captivating aesthetic results was the ideal, indeed perhaps the only, choice for the University of Chicago to honor Fermi.[43]

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[40]Luciano Boggio, "Italy: From Semi-Industrialized Economy to the Sixth Industrial Power," *Rivista Internazionale di Scienze Sociali* 103, no. 2 (1995): 223–52.

[41]Sargeant, "Maestro di Costruzione," *New Yorker*, June 11, 1960, 40–63 (quotes on 40–41).

[42]Ibid., 42.

[43]Ibid., 50.

Following their visit to Rome, McNeill invited Nervi to Chicago, anticipating a visit by Italian President Antonio Segni in late January 1964. Nervi, ill with the flu, had to postpone until March but understood the importance of governmental involvement, proposing that the University work out a program toward which he could prepare a study of "definitive architectural, urban, and economic features" that could be used for publicity and fundraising.[44] In hindsight, the fate of the project may have turned on a snowstorm that blanketed the East Coast during Segni's trip that grounded his flight to Chicago; Beadle never had the opportunity to further the discussion of Italian involvement.[45] Without assurances of backing from Italy, McNeill and Beadle nevertheless asked Nervi to come to Chicago as soon as his health and the weather cooperated, and Nervi returned to the city in early March.[46] Moore had by that time produced a small plaster model of what he at first called *Atomic Piece,* but expressed his desire to work separately from the building project. The University's plan was thus to place a replica of CP-1 in a Nervi-designed structure on the actual Stagg Field site and to have Moore's sculpture serve as a centerpiece in the Midway, the public park bisecting the campus that was a legacy of the 1893 World's Columbian Exposition.[47] Nervi, while glad that things were progressing with Moore, suggested that the sculpture and pavilion might still be somehow integrated.[48] Nervi thus arrived in Chicago on March 10 without a definitive program, but he toured the campus and attended a gala dinner in his honor hosted by Beadle and John Entenza, then leading the Graham Foundation, and including local design luminaries such as John Holabird, Bertrand Goldberg (whose Marina City was just in its final stages of construction), and SOM's Bill Hartman.[49] Both Nervi and McNeill regarded the visit as a great success but a conflict loomed. The University now planned to use much of the Stagg Field site for a new central library to be designed by Walter Netsch of SOM.[50] Nervi wrote to McNeill that he was "looking at many interesting possibilities" on his return to Rome. His office, however, was busy with large skyscraper projects in Sydney and Montreal, a bridge in Verona, new projects for

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[44]Nervi to McNeill, Jan. 7, 1964, in Folder P5516, "Università di Chicago," Nervi Collection. Nervi was fluent in French, but less so in English.

[45]"Snow Changes Italian Chief's Travel Plans," *Chicago Tribune,* Jan. 14, 1964, sec. 2, 8.

[46]Nervi to McNeill, Feb. 12, 1964, in Folder P5516, "Università di Chicago," Nervi Collection.

[47]McNeill to Nervi, Jan. 21, 1964, ibid.

[48]Nervi to McNeill, n.d., ibid.

[49]Dinner guest list, Mar. 11, 1964, copy in ibid. George Danforth also invited Nervi to visit IIT, but it is unclear whether the visit occurred.

[50]See Jay Pridmore, *Building Ideas: An Architectural Guide to the University of Chicago* (Chicago: University of Chicago Press, 2013), 91–93.

St. Mary's Cathedral in San Francisco, a stadium in Novara, and a new Papal Audience Hall for Vatican City that Nervi regarded as his most important work and a project that would dominate Nervi's time.[51]

McNeill sent information on CP-1's dimensions to Nervi in April, along with news that Netsch's library would be 250 feet by 250 feet and that Moore was planning a sculpture of "14 or 15 feet in height."[52] Nervi responded with an outline description for a pavilion that offered an architectural direction without pinning down program, dimensions, siting, or details. He proposed that Stagg Field be divided into two parcels, with an area alongside Ellis Avenue left clear for the memorial, which would include a garden for Moore's sculpture, and a square structure housing the pile replica, a conference hall, exhibition space, and archive. Nervi suggested that the structure be enclosed by glass so that the pile would be visible from the street and that it could be sheltered beneath a roof of ribs "disposed along the direction of principal moments" supported by four pillars of "stately white statuary."[53]

That description featured two well-proven techniques patented by Nervi's firm. For the simplest of those, Nervi and Bartoli twisted long, thin boards into carefully designed steel jigs to form piers of changing section that could match efficient shapes at their ends and middles. That technique was pioneered with Marcel Breuer at the UNESCO headquarters in Paris (1952–1958) and refined to shape piers for long span roofs at the Savona Railway Station and the large *Palazzo dello Sport* in Rome (both 1960). The Fermi piers proposed by Nervi were to have a rounded, cruciform base that provided a stable connection to the foundations, and a round top that allowed the roof to rock as it expanded or contracted on hot days. Those were similar in principle to his recently completed piers for the *Palazzo Lavoro* in Turin.[54]

The second technique proposed for the memorial used lightweight *ferrocemento* pans to achieve complex patterns of ribs in concrete roof structures. Nervi and Bartoli had used that technique to create statically inspired rib patterns in simple slabs such as at the Gatti Wool Factory in Rome and the State Tobacco Warehouse in Bologna (both 1951–1953).[55] In those, thin layers of wire mesh were laid up over

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[51]Nervi to McNeill, Mar. 27 1964, in Folder P5516, "Università di Chicago," Nervi Collection. See also Alberto Bologna, *Pier Luigi Nervi negli Stati Uniti, 1952–1979* (Florence, Italy: Firenze University Press, 2013), 108–15; Sergio Pace, "Papal Audience Hall, 1963–71," in *Pier Luigi Nervi: Architecture as Challenge*, ed. Carlo Olmo and Cristiana Chiorino (Milan: Silvana Editoriale Spa, 2010), 182–85.

[52]McNeill to Nervi, Apr. 3, 1964, in Folder P5516, "Università di Chicago," Nervi Collection. Numerous articles, press clippings, and photographs regarding CP-1 and Fermi's work seem also to have arrived in Nervi's office around this time. See Folder P5515, "Università di Chicago," ibid.

[53]Nervi to McNeill, Apr. 24, 1964, in Folder P5516, "Università di Chicago," ibid.

[54]Roberto Einaudi, "Pier Luigi Nervi, Lecture Notes Roma, 1959–60," in *La Lezione di Pier Luigi Nervi*, ed. Annalisa Trentin and Tomaso Trombetti (Milan-Turin: Pearson Italia, 2010), 112.

[55]Nervi credited Aldo Arcangeli, an engineer in his office, with the idea of instantiating these patterns in ribbed concrete.

A view of the Joseph Regenstein Library (on the former site of Stagg Field) on the University of Chicago campus. The open area to the west (left) of the library would be one location considered for a future Fermi memorial.

clay molds shaped to accommodate increasing shear loads in beams near girders (Bologna) or more complex, starburst-like patterns of isostatic stresses in flat slabs near their columns (Gatti).[56] Their instinctive visual appeal was as important to Nervi as their actual performance—"a clear reminder of the mysterious affinity to be found between physical laws and our own senses" in his words. Nervi saw the structural truth of such patterns as appropriate economically for factories, but also appropriate symbolically for honorific locations such as UNESCO's entrance as representations of universal physical principles.[57]

Nervi's proposal took those two well-established techniques and combined them into a design that would rely on the visual expression of physical principles for its architectural and ornamental signification of holy ground, lifting the flat dome of the isostatic ribs up onto four ruled-section piers. That set up a dialogue between earthwork forms—floor and piers—and a roof allusive of sacred, heaven-directed domes. Nervi, reserved in his pronouncements, never made such a comparison, but the structural rhetoric of his spiritual commissions, in particular St. Mary's Cathedral in San Francisco, suggests that the static language that he developed involving piers, podiums, roofs, and lightweight enclosing walls could evoke the sacred even in the engineered forms of reinforced concrete. A temple to science, a reverent memorial to an event that broke the fundamental bond of nature for the first time, must have seemed to all involved an appropriate arena for Nervi's dialogues of form, *techne*, place, and spirit.

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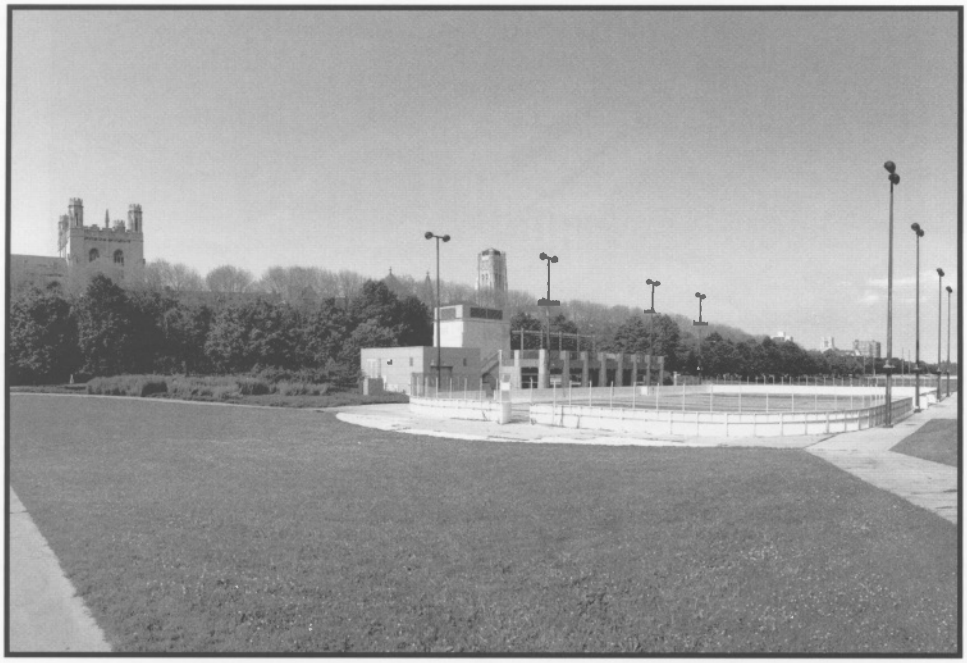
[56]Scholarship by Alan Holgate, Tuilia Iori, and Allison B. Halpern, David P. Billington, and Sigrid Adriaenssens has questioned the static validity of these ribbed slabs. See Halpern, Billington, and Adriaenssens, "The Ribbed Floor Slab Systems of Pier Luigi Nervi," *Journal of the International Association for Shell and Spatial Structures* 54 (2013): 127–35; Holgate, *The Art in Structural Design: An Introduction and Sourcebook* (New York: Oxford University Press, 1986), 263.

[57]Nervi, "Concrete and Structural Form," *Structural Engineer* 34 (1956): 164.



In 1964 a second location for the Fermi memorial was suggested on the Midway. Architect Pier Luigi Nervi, however, continued to prefer the former Stagg Field site.

Nervi's scheme proposed a portable monumentality, one that spoke to the power of structural truth independent of any specific site. As discussions about what would become Walter Netsch's Regenstein Library progressed, however, the Stagg Field site became more and more limited. SOM's original proposal, for geometric pavilions linked through Netsch's field theory technique of overlapping geometries, was rejected in 1964 and the library began to take shape instead as rectangular pavilions oriented along a north-south axis. That scheme was space-intensive, and it began to encroach on the memorial's 250-foot-by-250-foot site. On May 7, 1964, McNeill wrote to Nervi advising: "current library plan calls for a structure with an east-west frontage of 300 feet. This leaves about 190 feet between the library wall and the edge of the existing sidewalk." Anticipating Nervi's objections, McNeill suggested that "compromise between ideal and reality is the warp and woof of human life, as I find out with every further stage of this negotiation, and as I trust you discovered long before me. The narrower space that remains is there, real and waiting to be filled with a noble structure such as you can create."[58] But within weeks, the University's Board of Trustees further restricted the Fermi site, reserving only a 150-foot-by-500-foot site along Ellis Avenue. While that represented most of the frontage between Fifty-Sixth and Fifty-Seventh

[58]McNeill to Nervi, May 7, 1964, in Folder P5516, "Università di Chicago," Nervi Collection.

streets, Nervi was frustrated, writing back: "[I]f the decision to limit the place of Memorial Fermi to the 100' x 500' strip is final then, to my regret, I would decline the commission you so kindly proposed."[59]

Nervi flew to America in June 1964 to receive the AIA's Gold Medal at their annual meeting in St. Louis and to attend project meetings in New York and San Francisco.[60] McNeill met Nervi in St. Louis and convinced him to stay on. He noted, though, that Nervi was unenthusiastic about the restricted site and its planned neighbor:

> I showed him the plot plan of the Library as prepared on 11 June 1964 and he expressed dissatisfaction with the underlying idea: the library, he felt, should not be the dominating structure but should share pride of place with the memorial. One is for the University, the other for the world was his view—and the world should not take second place. He toyed with the idea of reorienting the library in such a way as to open a largish area in the NW corner of Stagg field for the memorial and garden, but was not pleased with that solution either, feeling that the spirit behind Netsch's broken outline was out of accord with his own principles of geometrical economy.[61]

McNeill offered Nervi an alternative that involved switching sites. Moore's sculpture could mark the actual site of CP-1 while Nervi's pavilion could be located on the more public Midway. Nervi, McNeill reported, was also unenthusiastic about the scale and the artifice of moving the pavilion from the "true site," suggesting instead that perhaps it would be best to settle "solely for Moore's statue with a fine garden around it and the library as backdrop."[62] In September McNeill wrote that the University, after discussions with surviving Fermi collaborators, had redefined the project and come up with a rationale for the more public Midway site. The design and calculation for CP-1 had occurred throughout the campus, not only at Stagg Field. There was thus a compelling reason for the memorial to serve as a campus-wide center. That combination had definite pragmatic value, too; there was, in McNeill's words, "space for a fine park all around it . . . it would make access easy, and solve the parking problem which in this country immediately arises at any point of pilgrimage."[63] Nervi, at this point consumed with the Vatican and St. Mary's Cathedral projects, concurred politely.

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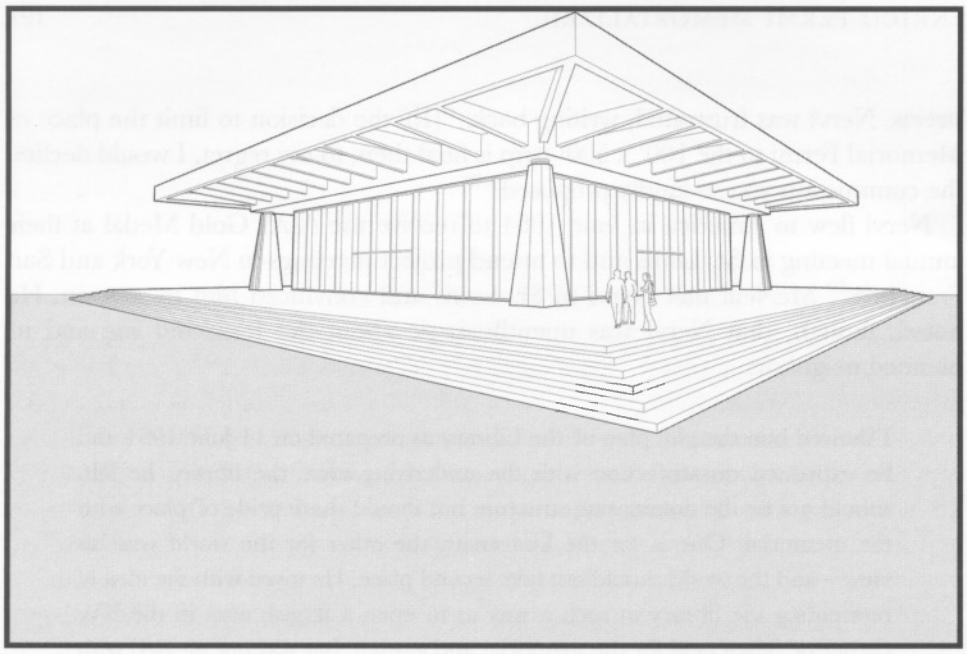
[59]Nervi to McNeill, June 3, 1964, in Folder P5516, "Università di Chicago," ibid. (translated by the author).

[60]McNeill to Nervi, n.d., in ibid.

[61]McNeill, report of interview with Mr. Nervi, St. Louis, July 19, 1964, Box 1, Folder 1, McNeill Papers.

[62]Ibid.

[63]McNeill to Nervi, Sept. 24, 1964, in Folder P5516, "Università di Chicago," Nervi Collection.



One of the few illustrations depicting the proposed Fermi Memorial.

"It would have been better to situate both the statue and the building in the Stagg Field . . . but I think that the Midway site is also a good one," he wrote in October. With a site agreed, however, other problems loomed. "Time has become very short," McNeill wrote.[64]

The University faced a suddenly urgent deadline to seek federal funding in January 1965. Support from the city and from the Daley administration had evaporated in the face of increasing racial unrest and a new political calculus that saw Daley abandon his traditional ethnic base in favor of an uneasy coalition of African American and working-class white support. For a decade Daley's support on the South Side had come naturally from Irish, Italian, and other white ethnic groups to the west. Careful, underhanded manipulation of ward boundaries and public-housing construction had similarly concentrated African American votes in a handful of safe wards. As long as those communities were segregated the Democratic machine was assured of substantial majorities and relative peace. But the expansion of traditionally black neighborhoods had not only caused racially charged "white flight" to the suburbs, it had also created flash points as perceived boundaries changed and as the administration tipped the scales to engineer its

[64]Nervi to McNeill, Oct. 17, 1964, and McNeill to Nervi, Sept. 24, 1964, both in ibid.

political advantages. Hyde Park and the University of Chicago had become one of the most blatant and difficult examples of the city's urban renewal, with thousands of African American families displaced at the quiet behest of the University. Protests by aggrieved residents matched the general tenor of race relations in the city throughout the early 1960s. The city's motivations were exposed and drew condemnation from civil rights groups and from the Catholic Church. School boycotts in 1963 and 1964 were joined by the efforts of the Coordinating Council of Community Organizations, formed in 1965, leading to Martin Luther King Jr.'s stay in Chicago's public housing in the summer of 1966. Substantial demolition and reconstruction proceeded anyway. Daley was damaged by the resulting unrest and by the symbolism of the city's most elite institution bulldozing a social rampart against the rest of the South Side. By 1965 Daley had good reason to both abandon the Italian American community, which still seethed at its own losses for his University of Illinois campus, and to appease as much as possible an aggrieved, vocal, and growing population of South Side residents. Placing a monument to the former on an open park space—even one surrounded by the University—was now politically impossible.[65]

In addition to appealing to the federal government, McNeill hinted that Italian support was also critical. "We are especially eager to have an Italian aid us in commemorating Fermi's great achievement," he wrote in September, "not simply because of the possibility of financial aid from the Italian government, but because such collaboration would extend to the artistic sphere the international collaboration which made the original scientific achievement possible."[66] McNeill suggested that Nervi draw up his proposed scheme to help solicit federal support. Nervi agreed, but wrote that because of the overwhelming nature of the Vatican project the office could not meet a December 1 deadline. He asked instead for a month's delay.[67] McNeill was nervous at the prospect of missing the federal deadline, explaining that something was needed to "persuade Congress to vote approval for the Memorial plan" in late December. He also asked Nervi to help find connections within the Italian government, reminding him of Fanfani's "two-year-old promise to take part in the enterprise."[68] Nervi, by now frantic with the

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[65]Cohen and Taylor, *American Pharaoh,* 231–32.

[66]McNeill to Nervi, Sept. 24, 1964.

[67]"What remains is to surmount the practical obstacles—money above all. . . . First we need your preliminary designs, to show the municipal and national officials whose approval will be required." McNeill to Nervi, Oct. 29, 1964, and Nervi to McNeill, Nov. 12, 1964, both in Folder P5516, "Università di Chicago," Nervi Collection.

[68]McNeill to Nervi, Dec. 18, 1964, ibid.

convergence of so many crises in the office, wrote on Christmas Eve that he was "extremely sorry" the date could be postponed no further; having been absorbed in the Vatican project, he would "try to study your project during the Christmas season" and have drawings sent by the twenty-eighth—a date struck out and replaced by "29th next," a telling correction.[69] "I can do nothing," Nervi concluded, "as to an eventual participation of the Italian government."[70]

True to his word, Nervi sent four sheets of drawings, a typescript description, and a perspective line drawing to McNeill on December 29, 1964—the only documentation ever made of the project. It was, in Nervi's words, "done in a great hurry," and the drawings were rudimentary, completed during the holiday by his architect son, Antonio.[71] Nonetheless, they showed the intent of the April 24 description: four tapered, undulating piers sheathed in granite, supporting a hovering concrete roof strengthened by curving, intersecting isostatic ribs and cantilevering beyond the four supports. Beneath this roof, a tenuous glass skin enclosed a large above ground hall, with a single stair connecting a basement story with gallery, conference, and service spaces, all barely delineated. Nervi's technical description suggested finishes throughout:

> The work is inspired by the concept of making visible to all, preserving in time, and fully realizing a genuine monument to celebrate the first atomic stack, achieved under the direction of E. Fermi in December 1942. . . . This monumental character will be obtained by placing the stack, rebuilt, inside a fully glazed, structurally expressive building constructed with noble materials of high quality. . . . On the ground will be a large room for meetings of specialized scientists, a museum for the preservation of memorabilia, a specialized library, offices, conversation lounges and other services. . . . The building will be at the center of the Midway between Ellis and University streets, and it will be surrounded by a large garden of superior design to create an oasis of green and of repose among the severe complex of university buildings. . . . The building structure consists of four large pillars in Nuraghe [Sicilian] black granite (or similar) of variable shape, as in the drawing, and formed, for obvious reasons, by fabricated drums of 50 cm. in height connected and made integral with each other with 5mm stainless steel sheets. . . . The surface of the pilasters follows a ruled network that connects

[69]Despite their worldwide acclaim, Nervi's office never grew larger than two dozen, and Nervi himself remained closely involved in all of the firm's work. Overcommitment and apologies for canceling travel were both hallmarks of his correspondence with clients during those years. Irene Nervi, interview with author, Feb. 2013.

[70]Nervi to McNeill, Dec. 24, 1964, in Folder P5516, "Università di Chicago," Nervi Collection.

[71]Irene Nervi interview.

> the points of the circle at the top with the corresponding points of the free-form base. It will be perfectly polished. The stainless steel sheets between the drums will connect surfaces to one another. . . . The support of the slab on the pillars is provided with small rollers or bearings on neoprene and stainless steel sheets so as to allow thermal expansions and contractions. . . . The bearings will be hidden within the upper collar in stainless steel. . . . The floor covering consists of a large slab with ribs arranged along the principal isostatic stresses. . . . This provision, which corresponds to physical laws, seems the most suitable to achieve both an aesthetically expressive aspect and a substantial formal severity. . . . The visible surface of the slab will be formed from precast *ferrocemento* made from white marble chips treated with rugasol, and will thus be absolutely white. . . . The floor will be made of polished gray granite slabs, as will the exterior steps. . . . The stack should be rebuilt exactly as it was, with the rudimentary control equipment that appear in the photographs that I have been sent. . . . In the same large room they could show large photographs on mobile easels that gradually explain and highlight the future progress of the peaceful use of atomic energy. . . . The perimeter will be double glazed to allow conditioned air coming from the lower floor. . . . A wide staircase will connect the main floor with the basement. . . . The planning provisions of this has been mentioned in very general terms, and given the simplicity of the structural elements we can easily find all the appropriate detailed solutions that you require.[72]

Nervi wrote an apologetic letter to Laura Fermi, noting that he had not had time to produce a more detailed set of drawings. "I had asked for an extension to January 31, but the other day I received a letter in which McNeil explained to me the impossibility of such a delay. And so I very hastily put something together in a few days. The idea at the time developed into drawings that I hope will give an idea of the project. I am disappointed because I wanted to present something slightly more developed."[73] She responded: "Do not worry if the sketches for the memorial are not as developed as you would have wished. Last night I spoke by telephone about the project. . . . [McNeill] said that the designs are certainly adequate enough to achieve the political and university approval."[74]

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[72]Nervi, *Progetto Preliminare per il 'Memorial Enrico Fermi, Chicago: Relazione Tecnica.'* TS, in Folder P5516, "Università di Chicago," Nervi Collection (translated by the author). For the corresponding drawings, copies of which were sent to Chicago, see "Memorial Fermi—Chicago / P. L. Nervi.—1964, Disegno 1205," Biblioteche di Arte, Teatro e CSAC, Università di Parma Archives, Parma, Italy.

[73]Nervi to Laura Fermi, Dec. 29, 1964, in Folder P5516, "Università di Chicago," Nervi Collection.

[74]Laura Fermi to Nervi, Jan. 8, 1965, in ibid. (translated by the author).

That political approval, however, formed the final chapter in the project, since the Midway site ran afoul of a state law prohibiting the erection of buildings on public parks unless they were "memorials or statues." "Is the structure you have designed a building, or is it a memorial?" McNeill wrote to Nervi in Febraury 1965, explaining the latest hurdle. "Legal opinions are being sought. . . . [T]he canopied roof you have designed would, in truth, hover over the dark mass of the reconstructed pile in a suitably marvelous manner, and I personally very much want to see your vision realized in stone and concrete. But when I get into the hands of lawyers, explaining what one can and cannot do, I feel helpless."[75] Nervi lent his opinion, writing that he very much saw the pavilion as a "memorial," but without an immediate decision from the state the project missed the deadline for funding bills to be introduced into Congress, then a two-year cycle. The City of Chicago, like the State of Illinois, balked at the idea of the Midway site, and enthusiasm for the project at the University of Chicago evaporated. McNeill's last letter to Nervi, dated January 20, 1966, was apologetic but final. "Authorities of the city of Chicago are not willing to back the project, and without their backing the University is unable to get the U.S. to act. . . . I feel that I have put you to considerable inconvenience in times past and intruded upon your time in what now seems to be a fruitless cause. . . . Perhaps in time to come the enterprise will be reborn, for the moment the only good I detect is the pleasure and honor I have had in meeting, talking, and corresponding with you."[76] Nervi wrote back cordially and there the project ended.[77]

McNeill and the University continued to work with Henry Moore, whose sculpture, *Nuclear Energy,* was dedicated on the CP-1 site on the twenty-fifth anniversary of the pile's criticality, on December 2, 1967. It sits today on a stark granite podium on the site of CP-1 with Netsch's Regenstein Library as a backdrop—much as Nervi had anticipated during his meeting with McNeill in St. Louis. The original Fermi Institute building, across Ellis Avenue, was incorporated in 2013 into Hellmuth, Obata, and Kassabaum's Eckhardt Center, while the later site proposed for Nervi's structure on the Midway remains parkland; its location occupied by the Midway Plaisance ice rink.[78]

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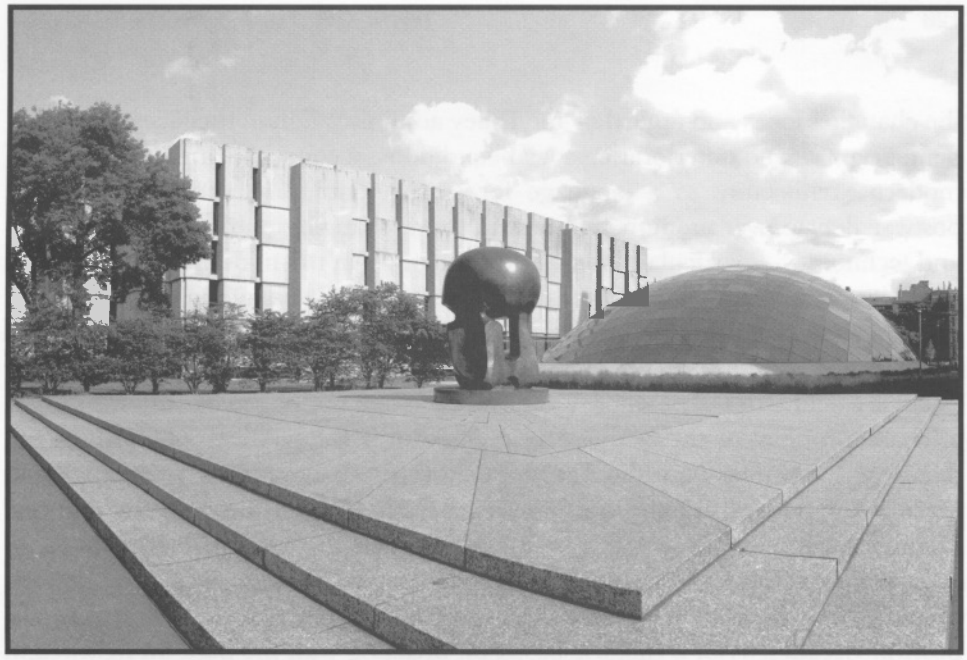
[75]McNeill to Nervi, Feb. 16, 1965, in Folder P5516, "Università di Chicago," Nervi Collection.
[76]McNeill to Nervi, Jan. 20, 1966, ibid.
[77]Nervi to McNeill, Sept. 7, 1965, ibid.
[78]See Pridmore, *Building Ideas.*



View of the original proposed memorial site, next to the Regenstein Library, with Henry Moore's Nuclear Energy *sculpture in the foreground.*

The height of *Nuclear Energy,* just over 3.5 meters, and its brooding presence—evoking a human skull, a bomber pilot's helmet, and a mushroom cloud—presented a far darker vision even than Nervi's attempt to capture the "high hope and profound fear" suggested by McNeill. Indeed, there is little hope present in Moore's sculpture, and even its name—changed to *Nuclear Energy* from the more politically minded *Atom Piece*—suggests the developing public opinion and perception that Moore and the University confronted. *Nuclear Energy* faced student protests at its unveiling; further protests would have greeted the more ingenuous commemoration offered by Nervi's temple form.[79]

Critical Assessment: Monumentality and the Atomic Age

Nervi's scheme and the entire idea of a monument to Fermi and the first atomic pile were linked to a specific moment in postwar attitudes toward science and monumentality. Several themes emerge in the project's history that intertwine with one another, revealing the rapid change in sensibilities during the mid-1960s: first,

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[79]See Iain A. Boal, "Ground Zero: Henry Moore's *Atom Piece* at the University of Chicago," in *Henry Moore: Critical Essays,* ed. Jane Beckett and Fiona Russell (Burlington, Vt.: Ashgate, 2003), 221–41; McNeill to Nervi, Nov. 15, 1963. Fermi received a perhaps more appropriate honor when the National Accelerator Laboratory in Batavia, Illinois, was renamed Fermilab in 1974. See "Fermi Cited at Dedication of Batavia Lab," *Chicago Tribune,* May 12, 1974, sec. 1, 39.

the changing focus and appeal of the Daley administration in the face of evolving demographics and deteriorating social conditions; second, the appropriateness of modern architecture as a language for commemoration that played into the postwar debate over monumentality; and third, changing public views of science and technology—particularly nuclear technology—in the mid-1960s.

It is easiest to blame the project's collapse on Chicago politics in the 1960s. The political cost of further provoking Hyde Park by such a symbolic gesture to a demographic whose voting power was dwindling must have presented an obvious political calculus to Daley, whose administration had nothing to do with the project after the proposal of the Midway as its site. But if the political implications and demographic context for the Fermi Memorial's abandonment were apparent, there were also profound undercurrents of cultural unease surrounding monumentality—and in particular atomic commemorations—around 1965.[80]

The debate over modernism's ability to rise to the demands for honorific monuments was a fundamental discussion in architectural circles during the postwar decades. With a rhetoric based on breaking with the past, on lightweight structures and transparent materiality, the International Style and its parallel movements in the 1920s and 1930s dealt with commemoration largely by eschewing it. But in the closing years of World War II, the idea of a progressive, technically inclined monumentality infused projects such as the *Architectural Forum*'s "City for 194X" project, which asked leading architects to consider appropriate responses to the new demographics, the seismic social changes, and the projected new aesthetics of a postwar culture. A conference held almost simultaneously and documented in *New Architecture and City Planning: A Symposium* (1944) also took on the absence of emotional or spiritual resonance in modernism's initial generation, suggesting that some recuperation of the symbolic commemoration that had long been classicism's great strength was necessary if the new idioms were to rise to the challenges of postwar culture and society.[81]

Some designers and theorists—in particular Jose Luis Sert, Fernand Léger, and Siegfried Giedion, in their 1943 manifesto "Nine Points on Monumentality"—argued for a new definition based in "Modern materials" and "Mobile elements" that would combine "functional" qualities with the "lyrical" aspects that seemed missing. Sert, Léger, and Giedion saw those immersed in both cities and in nature, producing "new architectural effects" that would be not only commemorative but also didactic, "for purposes of publicity or propaganda."[82] But a less constructivist,

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[80]Cohen and Taylor, *American Pharaoh*, 210.

[81]See Andrew Michael Shanken, *194X: Architecture, Planning, and Consumer Culture on the American Home Front* (Minneapolis: University of Minnesota Press, 2009), 32; Paul Zucker, ed., *New Architecture and City Planning: A Symposium* (New York: Philosophical Library, 1944).

[82]Sert, Léger, and Giedion, "Nine Points on Monumentality," in *Architecture Culture, 1943–1968: A Documentary Anthology*, ed. Joán Ockman, with Edward Eigen (New York: Columbia University and Rizzoli, 1993), 29–30.

more synthetic approach was suggested by Philadelphia architect Louis Kahn, whose 1944 essay "Monumentality," presented at the symposium that led to *New Architecture and City Planning,* proposed maintaining the *gravitas* of antiquity while drawing inspiration from new materials and scientific advances. Calling it "a spiritual quality inherent in a structure which conveys the feeling of its eternity, that it cannot be added to or changed," Kahn suggested that new monuments look equally to science as to painting or sculpture. Architectural monuments throughout history and across cultures, he argued, all shared "a striving for structural perfection which has contributed in great part to their impressiveness, clarity of form and logical scale." Without mimicking the forms or appearances of ancient buildings, Kahn thought, architects could nonetheless aspire toward the scale and emotional resonance of, for instance, Gothic cathedrals by adopting the same "love of perfection and . . . clarity of purpose" suggested by their spaces, the structures wrapping them, and the craft that had formed them.[83]

That sensibility resonated quite well with Nervi's work, and with his particular scheme for the Fermi Memorial. The breaking of atomic bonds was a shared cultural moment, something that knitted together not only the University in its commemoration, but also the entire nation in its appreciation, and the world in the gravity of its implications. Marking the site of one of science's greatest achievements with a structure based on simpler principles of physics that were both illustrative (in the ribbed ceiling) and evocative (in the point connections between earthbound piers and hovering roof) created just the clarity of form and purpose that Kahn had called for. Nervi's concern for the setting similarly shows his understanding that the scale of both the pavilion and its surroundings would also determine the suitability of the project to the event it recognized. But there also existed a far finer scale on which Kahn's call and Nervi's design resonated. Kahn proposed as an example of his approach a re-imagining of Beauvais Cathedral in steel, rather than in stone, with correspondingly lighter, more graceful members and wider apertures. At such a scale, however, the structural lines of such a building would have remained largely the same no matter what the material or era. In Kahn's words: "Glass would have revealed the sky and become a part of the enclosed space framed by an interplay of exposed tubular ribs, plates and columns of a stainless metal formed true and faired into a continuous flow of lines expressive of their stress patterns. Each member would have been welded to the next to create a continuous structural unity worthy of being exposed because its engineering gives no resistance to the laws of beauty having its own aesthetic life."[84]

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[83]Kahn, "Monumentality," in *Louis Kahn: Essential Texts,* ed. Robert Twombly (New York: W. W. Norton, 2003), 21–31 (quotes on 21–23). See also Zucker, *New Architecture and City Planning.*

[84]Kahn, "Monumentality," 26.

Debates on monumentality continued through the 1950s and 1960s in at least three veins: Kahn and others pursued a strategy of weighty construction that often alluded to classical forms or proportions; with its symmetrical arrangement and podium approach, Nervi's memorial design fit well into this category. But others took up Sert, Léger, and Giedion's call for a more agile, dynamic sensibility, which was illustrated by the hyper-mechanistic work of groups like Archigram in the mid- to late-1960s, and exemplified by Rogers and Piano's Georges Pompidou Centre in Paris, completed in 1977. And a middle ground that searched for a more modest approach that combined the desire for commemoration and architectural *gravitas* within a context of town planning and human scale emerged from discussions held by the International Congresses of Modern Architecture and later Team X throughout the decades. While Kahn's work drew praise for its gentle balance of classical and modernist sensibilities, the latter two positions gained greater traction through the upheavals of the late 1960s and the eclectic design culture of the1970s.[85]

Conclusion

Between the twentieth and the twenty-fifth anniversaries of CP-1, sensibilities, civic and ethnic politics, and economic realities all evolved, leaving the optimistic pronouncements and plans for a commemorative structure at the Stagg Field site as unfulfilled as contemporary promises of atomically powered cars or peaceful nuclear detonations. That transitional period, from the scientific and technological optimism of the immediate postwar era to the more skeptical overtones of the late 1960s, can also be read into such contemporary artifacts as airline terminals, which changed from celebratory pavilions to complex webs of circulation and services with the advent of the jumbo jet era, or the emergence of an antimonumental, even antistructural counterculture in architecture schools that reached a fevered pitch in 1968.[86]

Such changes can be seen in Nervi's career, too, and in particular in the rapid disappearance of his projects from the architectural press by the late 1960s. Nervi was in his seventies by the time he began the Fermi project, and the Vatican Audience Hall consumed his last productive years. With that project and St. Mary's Cathedral in San Francisco, designed in conjunction with émigré architect Pietro Belluschi and completed in 1972, Nervi's global career came to an end. In

[85]See, among others, Sarah Ksiazek, "Architectural Culture in the Fifties: Louis Kahn and the National Assembly Complex in Dhaka," *Journal of the Society of Architectural Historians* 52 (1993): 416–35.

[86]See Leslie, "The Pan Am Terminal at Idlewild/Kennedy Airport and the Transition from Jet Age to Space Age," *Design Issues* 21, no. 1 (2005): 63–80.

failing health he turned over much of the office to his sons by 1974, but while *Studio Nervi* continued to design buildings in expressed concrete through the decade in the Middle East and Africa, none of those projects garnered the attention that his work of the 1950s had.

The reasons for that are as varied as those for the Fermi Memorial project's demise. In part, Nervi had based his practice on an entrepreneurial model; one that relied on patents for a variety of concrete and *ferrocemento* techniques that he himself had secured. Those techniques had been born from the austere Italian economy of the prewar autarchic era, in which imports—especially steel—were limited. Nervi's techniques reduced the amount of reinforcing steel required by eliminating weight and by forming efficient structural shapes through simple jobsite processes. Even into the late 1950s the economic and material advantages that those patented systems brought ensured that Nervi's bids to design and construct public works would be competitive. But economic and industrial conditions changed around 1960; once regional, steel became a global commodity, bringing costs down even in countries like Italy that had little in the way of natural resources or a native industry. A younger generation of Italian engineers and builders who began practices after the war—Silvano Zorzi and Riccardo Morandi, in particular—were quicker to adapt to steel, which promised greater construction speed. In an era where inflation was rampant and labor expensive, those proved determinant in Italy's switch from concrete, and the handmade formwork of *cantiere Nervi* came to seem as artisanal in an era that began to favor industrially scaled construction.[87] Beyond the economics of Nervi's practice, however, his buildings had come to stand for an alliance between art and technology that faded from fashion in the last half of the decade. Nervi spoke about structural "truth" in a way that smacked of technological determinism; his lectures concluded with calls for "universal" or "timeless" approaches—terms that went against new architectural theories that favored ephemerality, changeability, and temporality. While Nervi's concrete domes had captured the enthusiasm for monumentalized science and technology in the jet age, the lightweight, tenuous do-it-yourself networks of Buckminster Fuller's geodesic domes appealed to the more skeptical ethic of the Whole Earth Catalog era. The "substantial formal strictness" that characterized Nervi's design for Fermi's Memorial had been appropriate for a celebration of physical law, but by the time of the project's cancellation such strictness seemed overbearing in the face of the subversive work emerging in architectural journals.[88]

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[87]See Sergio Poretti, *Italian Modernisms: Architecture and Construction in the Twentieth Century*, trans. Erika G. Young (Rome: Gangemi Editore, 2013).

[88]See "Archigram," *Design Quarterly*, no. 74/75 (1969): 28–33.

It is always a goal of architectural history to read cultural, social, and physical meaning into monuments, but sometimes what is not built can be as resonant as what is. A complex of cultural, political, economic, and social forces came to bear on the "holy ground" of the original atomic pile that rendered the Fermi Memorial—a project that barely existed outside of an unsuccessful competition, a few sketches, and a single box of correspondence—all but unbuildable as political tides in Chicago shifted and as the atomic era's promise faded.