FIVE BUILDINGS IN THE DALLAS CENTRAL BUSINESS DISTRICT

BY I. M. PEI AND PARTNER HENRY N. COBB:

A STAMP ON THE CITY'S DIRECTION

THESIS

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The purpose of this study is to examine I. M. Pei and his partner Harry Cobb's downtown Dallas architecture within the context of their overall stylistic development. This paper explores the structure of five buildings within the framework of the city, and addresses their possible influence on the city's future architectural direction. The thesis is divided into six chapters. Chapter I introduces and states the problem as it discusses the fabric of Dallas architecture. Chapter II outlines a brief biography of I. M. Pei, looking to those who have influenced him, while discussing the key public buildings of his stylistic development. Chapter III is devoted to Pei's first structure in the city, the Dallas Municipal Administration Center. Chapter IV explores the concepts of his planned Morton H. Meyerson Symphony Center. Chapter V outlines a brief biography and focuses on the work of Harry N. Cobb: One Dallas Centre, ARCO Tower, and the Allied Bank Tower. Chapter VI summarizes the contributions of Pei and Cobb by placing them within the context of twentieth century architecture, and pointing out their specific achievements with their additions to the fabric of Dallas architecture.
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CHAPTER I

INTRODUCTION

THE FABRIC OF DALLAS ARCHITECTURE

History confirms the fact that architecture is a true mirror of life and time.

The Greeks gave form to the concept of democracy on the Acropolis. The Romans expressed their genius in the organization of men in the forums and the stoas. The men of faith everywhere in the history of time dedicated their spiritual beliefs in great temples, mosques and churches. Architects of our time, from the design of a house to the design of a city, must search for that essential element in our lives which possesses that enhancing and ennobling quality if we are to create architecture that is great.

Architects as artists investigate the play of volumes in light, explore the mysteries of movement in space, examine the measure that is scale and proportion, and search for that special quality that is the spirit of the place, as no building exists alone.

Architects as individuals produce buildings as unique and varied as themselves. These artists, unhindered by a master plan, have created a unique city in north Texas called Dallas (See Fig. 1.1). "The oldest cliche about Dallas is that it has no reason for being, that it represents an act of will rather than a logical response to topography and climate." Visualize a flat, wide stretch of North Texas prairie traversed by a trickling river, the Trinity. In 1841 a lawyer-merchant, John Neely Bryan
received a "head right" for 640 acres near a bluff on this river from the Republic of Texas. He established a trading post—a simple structure constructed of hewn logs sealed with clay. He sold food and supplies to pioneers traveling west before ferrying them across the river. Five years later he became Dallas' first real estate agent by dividing his land into blocks of 200 square feet each and selling them to those who stayed behind.⁴

As Bryan's land began to sell, other developers plotted pieces of prairie. The neighboring land of John Grisby was laid out on another axis. Unfortunately, the gridiron street pattern of the two systems happen to be 30 degrees askew, and no attempt was made to integrate them (Fig. 1.2). This frontier right to do as one pleased on one's own land without regard for the whole is a premise which persists throughout Dallas' 145 years of building.⁵

Prosperity has not produced the perfect city, however; Dallas' architectural environment is continually being evaluated and is continually found to be lacking. A common observation is that the same free-spiritedness and independent thinking which made Dallas grow made it grow rather haphazardly, even within the constraints of zoning. We find one building here, a totally different building there, and little regard for context, for the spaces in between. The city lacks the character and cohesiveness—the strong sense of place—that emerges from collective, rather than independent efforts.⁶

To understand Dallas architecture, the forces at work during its brief history must be examined. Creating something from nothing pervades all of Dallas' history. Without this motto, the city would not have grown. With only the most tenuous aesthetic direction, Dallas managed to build, demolish and rebuild an entire city and regional center where there had only been a bleak prairie a short time before.⁷
"It is a speculator's dream city--open, welcoming, without mysteries or dark secrets--where betting on the outcome is considered standard operating procedure." In the 1870's, the city fathers/speculators using cash, land, and a free right of way, convinced the state legislature to reroute both the north/south and east/west lines of the railroad so that they might cross in Dallas, setting off the boom that continues today. Entrepreneurs joined agricultural pioneers with a Protestant heritage to create a Dallas architecture considered a utilitarian one. Bryan and Grisby's blocks soon began to fill with simple houses with towers and Victorian gingerbread trim. The city grew quickly, to twenty thousand people by 1885. Oak Cliff and East Dallas were annexed in 1887 and 1890. The basic fabric of the city began to be interwoven. At the turn of the century, Dallas added banks and warehouse distribution centers as building types to its low skyline.

By 1910, a hundred thousand people populated the city's various disconnected patchwork areas. City fathers, urged on by neighborhood organizations, hired George Kessler of Kansas City to develop a vision of what Dallas could be. Kessler projected a civic center, a transportation gateway to the city and landscaped parkways to act as strong visual connections between city parts. Only his utilitarian suggestions were followed: flood control, railroad organization and street improvements. Thanks again to that frontier spirit of individualism, the city fathers saw no need for high order of civic design. The 1920's saw the age of City Beautiful pass into the era of City Efficient as the population grew to one hundred and sixty thousand. However, the architectural revolution changing Europe was taking its time reaching Dallas. The Magnolia
Building, designed by architect, Alfred C. Bossom in 1922, became the city's "first genuine skyscraper—twenty-nine-stories, 416 feet, a slice of New York transplanted to the corner of Akard and Commerce."  

With the Texas Centennial, came a new style which underscored the absence of a viable local building tradition: "Texanic." The hundred year celebration was "awarded to the city that offers the largest financial investment and support of to the state of Texas." Through the efforts of mayor R. L. Thornton and architect George L. Dahl, a modern classical style of pure fantasy (in fact, a variation on a Beaux-Arts theme) came to Dallas in the form of twenty-six buildings at Fair Park worth $25 million, erected in nine months during the height of the Depression.

In the 1940's, Frank Lloyd Wright designed a sixty story hotel for Rogers Lacy, but unfortunately, it was never built because of Lacy's untimely death (Fig. 1.3). Wright proposed cladding this structure in five-by-six foot diamond-shaped glass panels designed to overlap like gigantic fish scales. In the interior, a one-hundred foot tall atrium was to bring light to a landscaped central court. All of the rooms looked out to the city while their entrances looked down to the spatial core. Instead of a Frank Lloyd Wright building, however, the dominant structure added to the Dallas skyline in the 1940's was the Mercantile Bank Building (Ahlschlager and Nelson, 1942), built by developer R. L. Thornton. Popularly known as "Dallas' Battleship," it was the only skyscraper built in the United States during World War II and began a thirty-year period of rather mundane architecture in the Central Business District (CBD) (Fig. 1.4). Frank Lloyd Wright did not mince words nor was he favorably impressed by what he saw: 'Downtown Dallas buildings have about as much
life as a rubber doormat.\textsuperscript{13} In all fairness, the details of the structure's interior space brought forth a union of craftsmanship and fine materials—a lesson learned from the Bauhaus—as well as a mixed use concept in downtown building.

In the 1950's, the International Style came to Dallas with the construction of a series of new hotels and office buildings. Dallas caught up with the pervading new architecture that was emerging in cities all across America, thanks to lessons learned from Gropius, Le Corbusier, and Mies van der Rohe. The first and most impressive example of this new style was the Republic National Bank (Harrison & Abramowitz, 1953) (Fig. 1.5). This quintessential 1950's shaft rose thirty-nine stories straight up from the ground to a flat top and was joined in 1964 by a fifty-two story companion tower. Later, the Statler Hilton (William Tabler, 1955) and Southland Center (Welton Becket, 1958) also showed the new direction toward slab building, curtain walls of glass, porcelain enamel panels, deliberate abstractions and minimal decoration that defines modern architecture (Fig. 1.6).

Because Dallas has always been a developer's town, the idea that "sprawl is O.K. and nothing bad ever happens from growth is taken as gospel."\textsuperscript{14} As was the case with the rest of the country, the automobile shifted the growth pattern away from the CBD. Consequently, commercial building in downtown was practically nonexistent in the 1960's. The thirty-four story One Main Place (Skidmore, Owings, and Merrill [SOM], 1968) expressed a commanding presence through a union of both its poured concrete skeletal frame and its recessed, repetitious coffer-like windows (Fig. 1.7).
Starting in the 1950's and continuing to this day, a major portion of Dallas has been built by individuals who went to school under the direction of Trammell Crow. Most of his buildings have been uniquely successful because he has sacrificed originality and style for a more lucrative relationship with his tenants, putting their practical needs ahead of architectural aesthetic. Trammell Crow's first building in the CBD was Bryan Place (Neuhaus & Taylor, 1972). This building combined exposed I-beams vaguely reminiscent of Mies van der Rohe's Seagram building with gold-plated reflective glass (Fig. 1.8). Toward the end of the 1970's, other developers with this same attitude began filling the CBD with a number of buildings that confirmed Dallas' place as a city of modern and late modern buildings that varied in aesthetic appeal. The First International Building (Hellmoth, Obata & Kassbaum, 1978) was the classic glass box of the modern movement (Fig. 1.9). A stunning piece of late modern architecture and the first true landmark building for Dallas is all accomplished with distorted reflective mirrors and lights at the Hyatt Regency Hotel and Reunion Tower (Welton Becket & Associates, 1978). "Floating in a sea of space" and acting as a "visual anchor" for the West End of the CBD, is this "cluster of twelve elegant cubes and columns" finished in a slippery wet look (Fig. 1.10).  

In the 1980's, the Dallas CBD has experienced the greatest structural growth in its short history with the addition of eighteen major office towers, ranging from seventeen to seventy-two stories. "Statistically, this puts Dallas in the forefront of American cities; architecturally, it leaves it still in the middle of the second tier--booming but directionless." Developers in Dallas, like Trammel Crow, are responsible
for this by flooding the highrise real-estate market with a generic style of architecture. Some buildings have, however, risen above the rest. First City Center, built by a Canadian developer in 1983, is a box that has "been pushed and pulled, nipped and tucked until most traces of its geometric origin have been obliterated (Fig. 1.11)."\textsuperscript{17} The base of the building has been turned 45 degrees to capitalize on the intersection of two downtown street grids (Bryan's property meets Grisby's). Promoted as the "campanile" of the Arts District, LTV Center (SOM, 1984), built by Trammell Crow, is a romantic skyscraper (Fig. 1.12). Its hard-edged details embellish the mass of smooth surfaces of buffed and polished stone and glass. This pyramid-topped, dark-faceted tapering tower possesses a base with a pavilion for the flow of pedestrian traffic. This structure was designed to be a dominant landmark of the city.\textsuperscript{18}

The CBD has numerous buildings derived with varying degrees of fidelity from more famous originals elsewhere with the idea that, "If it worked in such and such a place, it is bound to work here."\textsuperscript{19} Thanksgiving Tower (Harwood K. Smith, 1983) possesses the same receding corners as does the IDS Center in Minneapolis. San Jacinto Tower (Beran and Shelmire, 1983) has the stacked book look of the Embarcadero Center in San Francisco. In material and form, Lincoln Plaza (Harwood K. Smith, 1984) harkens back ten years to the design of the Bank of America, also of San Francisco. Accepting the premise that "that's good enough for Dallas," these knock-offs became part of the skyline (Figs. 1.13 - 1.15).\textsuperscript{20} In their isolation, these buildings point out a lack of visual and architectural coherence.\textsuperscript{21}
I. M. Pei & Partners have been responsible for the design of five major public and private structures within the CBD during the last decade. They include The Dallas Municipal Administration Center (1978), One Dallas Centre (1979), the Atlantic Richfield Tower (1984) the Allied Bank Tower (1986), and the Morton H. Meyerson Symphony Center (1988). They are some of the strongest architectural statements in Dallas. Interested in both the art and the market for that art within the urban condition, it has been said that "each of his buildings tends to become the entering wedge in the attainment of some greater, public goal, such as the renewal of a significant portion of a city, or the welding together of previously antagonistic neighborhoods." This study will examine that statement as it pertains to five buildings in Dallas by I. M. Pei and partner Henry (Harry) N. Cobb.

STATEMENT OF PROBLEM

The purpose of this study is to examine I. M. Pei and his partner Harry Cobb's downtown Dallas architecture within the context of their overall stylistic development. This paper will explore the structure of these five buildings within the framework of the city, and will address their possible influence on the city's future architectural direction.

The thesis is divided into six chapters. This chapter introduces and states the problem as it discusses the fabric of Dallas architecture. Chapter II outlines a brief biography of I. M. Pei, looking to those who have influenced him, while discussing the key public buildings of his stylistic development. Chapter III is devoted to Pei's first structure in
the city, the Dallas Municipal Administration Center. Chapter IV explores the concepts of the Morton H. Meyerson Symphony Center, under construction at this time. Chapter V outlines a brief biography and focuses on the work of Harry Cobb: the completed One Dallas Centre and ARCO Tower, as well as the nearly complete Allied Bank Tower. Chapter VI summarizes the contributions of Pei and Cobb by placing them within the context of twentieth century architecture, and pointing out their specific achievements with their additions to the fabric of Dallas architecture.

METHODOLOGY

The primary source of material for this investigation is the review of the literature on twentieth century architecture, I. M. Pei, and Harry Cobb. Periodical and newspaper articles provide specific information about Pei and Cobb, their firm, their architectural theories, and the buildings themselves. Along with an on-site study of the structures, specific questions about City Hall and Symphony Center were answered by I. M. Pei in a forty-five minute telephone interview. Harry Cobb was not available to address, in writing or by telephone, specific questions about two of the three Dallas structures he was responsible for. However, in a presentation given at the Allied Bank Tower, Cobb answered general questions about that particular structure and its effect on the city. Additional information was provided by previously published interviews with both Pei and Cobb. The building manager of One Dallas Centre, as well as the vice president of Criswell Development Company (Allied Bank Tower) were also available for comment. Security measures at the ARCO Tower disallowed a full
investigation of the structure and any discussion by its occupants. This study is intended to fill a gap in the literature about I. M. Pei and Harry Cobb's buildings in the Dallas CBD as current information is limited to simple, descriptive references in pamphlets and journals.
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Fig. 1.4 Mercantile Bank Tower
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Fig. 1.10 Hyatt Regency Hotel, Reunion Tower
Fig. 1.11 First City Center

Fig. 1.12 LTV Center
Fig. 1.13 Thanksgiving Tower/IDS Center

Fig. 1.14 San Jacinto Tower/Embarcadero Center
Fig. 1.15 Lincoln Plaza/ Bank of America World Headquarters
NOTES


2. Ibid.


6. Ibid., p. 29.

7. Ibid., p. 5.


10. Ibid., p. 36.


12. Ibid., p. 12.

13. Ibid., p. 32.


15. Ibid., p. 111.

16. Ibid., p. 156.

17. Ibid., p. 159.

18. Ibid.

19. Ibid., p. 162.

20. Ibid.


Ieoh Ming Pei was born in Canton, China, April 26, 1917 into a powerful and wealthy banking family. He spent his early childhood in the southern part of China, seven years in Hong Kong where his father established a branch of the Bank of China, and his teens in Shanghai where he continued a traditional education.

During my last years in high school in Shanghai, there was a tremendous amount of building. The twenty-five story Park Hotel was then under construction. I was fascinated by the idea of a building of that height. It was as exciting to me then as the idea of going to the moon is to youngsters of today. I decided (at that time) that was what I wanted to do.

In 1935, at the age of 18, I. M. Pei came to the United States to complete his education. He was initially accepted at the University of Pennsylvania. However, prior to the beginning of the term, deciding that design was not his forte and thinking that he was more suited to the study of building or civil engineering, he enrolled at the Massachusetts Institute of Technology (M.I.T.) in Cambridge. There he met Dean William Emerson, Director of Engineering. Over the next two years this advisor and guardian coaxed Pei into the field of architecture. It was during a trip to London that Pei realized what he really wanted—a clear, pragmatic knowledge of buildings and how they are constructed. "I was impressionable to the point of being naive, but very curious. I think curiosity was an
important trait, because of curiosity I always inquired." Graduating in 1940 with a B.A. in architecture, he was offered a traveling fellowship by M.I.T., but because Europe was at war, was persuaded by Dean Emerson to stay at Cambridge where he worked as a research assistant for the Bevis Foundation. Six months later Pei joined Stone and Webster, an architectural firm, where he stayed until 1942. That same year he married Eileen Loo, a Chinese student who graduated from Wellesley College. They had been seeing each other since her arrival in the United States in 1938. It was through his wife that he met some of the professors at Harvard who persuaded him to apply to the design school there. "When I decided to go to Harvard to study under Gropius, Dean Emerson was very unhappy. He felt almost betrayed. He was deeply committed to the Beaux-Arts method of education and genuinely felt that the modern movement was mistaken."

Before enrolling at the Graduate School of Design (G.S.D.) at Harvard, Pei volunteered to work with the National Defense Research Committee. For two and a half years during World War II, Pei was part of an intelligence unit in Princeton, N.J. Understandably, his heart was not in his work, as his job was to figure out how best to destroy Japanese villages. Advised by his father to stay in the United States because of instability in China, he returned to Harvard in 1944. "What happened to China afterward is history. I am forever grateful for his advice." As assistant professor there from 1945 to 1948, he joined a zealous, vibrant community of architects centered around Walter Gropius and Marcel Breuer, refugees from the Bauhaus, whose modernist thinking set Pei's basic design direction. Because of the war, seventy-five percent of his class were students from
other countries. "In those days, we were together all the time, absorbing each other's ideas. I stayed at Gropius's house a whole summer. My wife and I spent many weekends with Breuer, talking, discussing, arguing, learning."6 Pei graduated with an M.A. in architecture in 1946.

In 1948, Pei's work caught the eye of the visionary real-estate developer William Zeckendorf, who, in a gesture almost without precedent in American architecture, launched Pei in practice as the staff architect of his firm, Webb and Knapp, headquartered in New York City. "It was about time the modern Medici began hiring the modern Michelangelos and DaVincis," said Zeckendorf to Nelson Rockefeller.7 Although it was a principle then that an architect should not work for a developer, Pei's role from 1948 until the end of the next decade then, was a one-to-one relationship with Zeckendorf. Pei learned more about the real-estate business as well as learning as much as he needed to know about architectural design. He became an organizer, spending fifty percent of his time flying around the country with Zeckendorf on his DC-3.

In 1951, Pei was awarded the Harvard Wheelwright Fellowship and spent the time visiting the architectural monuments across the United States. Three years later he became a naturalized citizen of the United States. Pei served as a member of the Visiting Committee of the Harvard G.S.D. from 1958 to 1963, and also served on the Visiting Committee on Architectural Education at M.I.T. from 1956 to 1959. By 1955, while still continuing to head the design staff for Zeckendorf, Pei began taking some independent commissions. His first, a concrete tower for the Earth-Science Center at M.I.T. turned out to be ill-fated; a serious error in the design of an open ground floor turned the base of the building into a wind tunnel. But the
functional problems did not deter other clients from coming Pei's way, and by 1960 he left Zeckendorf entirely to set up his own firm.  

In 1966, Pei completed the commission for the National Center for Atmospheric Research in Boulder, Colorado. After years of always looking over the shoulder of other architects in Zeckendorf's office and just participating in the creation of a concept, or occasionally drawing a line to test out an idea, Pei now sat at the drawing table. This project was his first personal expression in years and not a group effort. "I began to know how little I knew, and, finding that out, I acquired an appetite for designing more, much more." He has continues to this day. In 1966, Pei had already formed the nucleus of the office that remains with him to this day: partners Henry N. Cobb, Eason H. Leonard, and Araldo A. Cossutta, who collaborate with and are supported by the associate, Leonard Jacobson, James I. Freed and Werner Wandelmaier and a staff of over one hundred and fifty.

The work of I. M. Pei & Partners reflects the firm's conviction that a meaningful environment for an urban society can be achieved only when individual building projects are conceived within the framework of their larger urban setting. For this reason a great part of the firm's varied practice has been devoted to the planning of large-scale building complexes for private developers, educational and religious institutions and public authorities. The composition of the firm in terms of size, range of competence and diversity of talents reflects this particular aim. The continuity of the Pei staff is especially unusual in the world of architectural practice. The leadership of the Pei office has been there
for three decades. They are architects who have learned how to bring out the best of each other as people do in a successful marriage. The award-winning projects by the firm are too numerous to mention. The firm was appointed planning consultant to Columbia University in the City of New York in 1968. That same year the Architectural Firm Award of the American Institute of Architects was awarded to the office of I. M. Pei & Partners at their National Convention.  

Pei is a Fellow of the American Institute of Architects and of the American Academy of Arts and Sciences. He is also a member of the National Institute of Arts and Letters and an Academician of the National Academy of Design. He was appointed a member of the National Council on the Humanities by President Johnson in 1966. That same year he was a member of the Mayor's Task Force on Urban Design (City of New York) and now serves on the Urban Design Council. Pei was the recipient in 1961 of the Arnold Brunner Award given annually by the National Institute of Arts and Letters for excellence in the field of architecture. In 1963, he was honored by Rice University as one of the "People's Architects" designers whose work has shown social significance and a sensitivity to the needs of the American people. The New York Chapter of the American Institute of Architects awarded him its Medal of Honor that same year. Pei has countless Honorary Degrees from universities worldwide. In 1979, he received The Gold Medal from the American Institute of Architects, the highest award in the field. And finally, in 1983, he won the new Pritzker Architectural Prize.  

Curiously, in light of such a highly visible body of work, I. M. Pei remains a remarkably private and retiring individual. Pei is the father of
four children, three sons and a daughter. Two of the sons, Chien Chung and Li Chung, work in their father's firm. Both studied architecture at Harvard. The third son, Ting Chung, is a real-estate developer. Pei's daughter, Lian, is attending college. He and his wife live at Sutton Place in New York City and have a "weekend house" in Westchester County which Pei himself designed. He spends his leisure time gardening. He is also an avid collector of modern and contemporary art. Although it reduces his productivity, Pei now travels a great deal to seek commissions in the U. S. and abroad to support the firm. He is not a fashionable darling of the architectural intelligentsia, nor is he an idol of modish young design students. He states flatly that he is "not trendy and not a revolutionary." There is no Pei cult. "I'd like to be known really, as an architect of my time. I am trying to do my best under that circumstance. That's all and nothing more."12

STYLISTIC DEVELOPMENT/KEY PUBLIC BUILDINGS

In 1948, as William Zeckendorf's in-house architect for Webb & Knapp, he was given almost unlimited opportunities to project, plan and design. Thus, at thirty-one years of age, I. M. Pei began his journey of stylistic development that has brought him the respect and reknown that he now enjoys. By surrounding himself with former students and "other kindred spirits," he set up shop on Madison Avenue in Manhattan. The firm, I.M. Pei & Partners, which continues to this day, may be the very best fraternity of architects functioning in the U.S.A. at this time.13
Pei reflects:

I think that Pei or any other architect cannot deny the fact that they are influenced by works of the past...what they are influenced by is what is important. They have to acknowledge that what has been done in the past has a tremendous influence on what they do, but to be influenced is not the same thing as to imitate.

Pei, like most of his peers, looks to the first generation of the Modern Movement: Frank Lloyd Wright, Walter Gropius, Ludwig Mies van der Rohe and Le Corbusier as major influences in style. These giants were looking for synthesis in their architecture and pointed the way for Pei to achieve the respect that he now enjoys after a long career of discovery. How does I.M. Pei fit into the stylistic development of modern architecture?

At the turn of the twentieth century, doctrines with titles like "functionalism, expression of structure and materials, organic architecture, and machine aesthetic" evolved. They all shared one feature: "the redefinition of architecture in a pristine, abstract way, quite apart from any sacrosanct stylistic label." This was a new, completely unique style based on expressive and utilitarian criteria rather than upon any systematic concept of structural or compositional principles. Clearly formal and spatial configurations of a new vision, conditioned by new attitudes adapted from research in science, technology, sociology, and ethics form the ideas of the Modern Movement: "It is based on an assemblage of factual data and subjective prejudices concerning the nature and need of contemporary man and his relationship to a new and perplexing universe." Man realized that the physical world was no longer the exclusive product of natural conditions, but more of a world of his own devising.
The first climactic moment of major creativity in this new architectural style came about 1910 with the epoch of Frank Lloyd Wright's greatest prairie houses and Peter Behrens' Berlin Factories. It was Wright who first introduced an integrated twentieth century style bringing together the many and varied tendencies of modern architecture. Wright followed a form of academicism which provided a force of order and discipline to clarify the romantic, picturesque side of his individual stylistic architectural development. He was the first who managed to rise above the limitations of his source material to create a personal, contemporary style in which the past was made to serve the present.17

A second climactic moment of creative activity came as a period of clarification centered around the peak years of the International Style (1927-1932). The forms created were almost completely abstract, that is, their appearance and expression owed nothing outwardly to traditional architectural vocabularies. Space and form ceased to be separate and distinct but were now woven together. In art, "these startling ambiguities of solid and void produced a deliberate confusion of within and without, most notable in the complex analytical figures and still lifes of Picasso and Braque."18 In architecture, these ambiguities resulted in a style made up of glass-enclosed volumes, with textureless walls independent of structure. Made of steel and reinforced concrete, these structures lacked any direct visual correlation to structural stability of the laws of gravity. Interior and exterior space flowed around partitions and were blurred. Forms were undecorated except for patterns inherent in the building material and design was simplified. Following Frank Lloyd Wright's lead, these classic International Style buildings include the work
of Gropius, Le Corbusier and Mies van der Rohe in which a rationalism of form became the major stylistic ideology.¹⁹

Using the vocabulary initiated by Frank Lloyd Wright and Peter Behrens, Walter Gropius created an industrial complex at the Bauhaus at Dessau without reference to architecture of the past but with thoroughness and distinction of the present. His new architectural vocabulary was made up of great walls of glass windows framed in metal devoid of decorative features; covered surfaces of smooth white plaster stucco stressed the buildings' rigid geometric forms and relationships. The complex possesses a formal serenity but also a warmth of movement based on the life that was to be lived within it. Within these wall-enclosed volumes, each geometric element had a precise relationship with the others and each appeared tense and complete until considering the whole. Thus, the separate buildings, with their separate forms and parts (design elements) were worked together for the greater good.

This new unity between art and technical matters which Gropius taught in his school was put to the test in the Bauhaus building itself. Gropius realized that a building could be aesthetically impressive, even monument, without moving away from human scale and keeping rigorously attuned to utilitarian needs. Gropius wrote:

The solution depends on a change in the attitude of the individual towards his work, not on outward circumstances, and indeed the lesson of the Bauhaus affected what really counted in planning, the distribution of human energies rather than technical instruments or formal models.²⁰

During his training, Pei's years at Harvard's Graduate School of Design were the most exciting years of that school's history--the most exciting,
indeed, of all American architectural education because Walter Gropius and Marcel Breuer directed the program. There was also an extraordinary collection of young talent in the area. Philip Johnson, Eduardo Catalano and Harry Seidler were recent Harvard graduates, and in the years when Pei was a young instructor the school’s students included Victor Lundy, Paul Rudolph, and Henry N. Cobb, all soon to take their places in the front ranks of modern design.21

Pei remembers:

In those years 'form follows function' was not just a slogan, it was almost a moral imperative. I understood Gropius's need to take a doctrinaire position in order to bring about the change but some of us who were in school then thought his functionalism was perhaps overly simplistic. Gropius was really a great teacher. He encouraged discussions in the studio. On one occasion, I took issue with him on the subject of the International Style. I thought the differences in cultural and historical traditions would result in a variety of architectural expressions. To prove my point, I chose as a design problem a museum for Chinese art in Shanghai, which attracted considerable attention at the G.S.D. I remember well that Breuer defended my position very strongly to the jury. That was the first time I realized there was a difference of opinion on fundamental issues even among those who were involved in the making of the modern movement. From Breuer, I learned that to understand architecture, one must understand life. There was much empathy between us and we have been close friends to this day. I also think that Breuer was much more influential than he has been given credit for. A whole generation of architects was influenced by his early work, particularly his interest in light, texture, sun and shadow.22

During those years as a professor, the work of Frank Lloyd Wright had a deep appeal for Pei, especially his 1904 Larkin Building in Buffalo and his 1909 Robie House in Chicago. "These are the kind of structures, worth as much for their humanistic principles as for their formal or technical innovations, that will be studied five centuries from now."23 Only once did Pei attempt to stray from the functional path he was shown by Gropius
at Harvard. He drove to Taliesin East in Spring Green, Wisconsin, to see what he might learn from Frank Lloyd Wright. "I drove into the compound, and stopped, not knowing where to go. Suddenly seven huge Alsatian dogs pounced on my car and barked and yelped at me. They looked ferocious. I felt trapped. Several students just stood there and laughed. I drove away."

Pei does not regret the many years he spent as Director of Architecture for Zeckendorf's firm of Webb and Knapp:

It was 10 years out of my life as a designer, but looking back, I wouldn't swap that experience for anything. I learned things that serve well today—the big picture, the flow of economic, political, and civic decisions, the importance of seeing land as a precious raw material to be carefully used since urban land is worth millions, and of being able to sense the influences that bear upon that land as well as on what you want to do. So today when I walk in— I don't care whether it's Australia, Singapore, Paris, or Dallas—and am shown a piece of land, I see a lot more than most architects because of the Zeckendorf education. He had a vision that there could be, and needed to be, gigantic effort to bring back our cities.

Pei remembers:

I also learned about the role of the architect as civic leader and I think that that has been one of my contributions. I learned, too, that you have to establish credibility with a client; that when you have that you can do so much more.

Zeckendorf, for his part, regarded Pei as:

probably the greatest site planner alive... a perfectionist, but practical, a pleasant guy to have around. We were a great team, each one teaching the other. One of the finest things I ever did was draw my friend (Pei) away from the halls of academe and into the world of building.

However, in one of his less profound utterances as an observer commenting on the works of Webb and Knapp, Frank Lloyd Wright is supposed to have said, "Bill Zeckendorf has a real-estate office with a Chinaman in the back room."
As Zeckenforf's Director of Architecture from 1948 to 1960, Pei's work was strongly influenced by Mies van der Rohe. Pei and the seventy designers working for him planned and designed Denver's Mile High Center, Montreal's Place Ville Marie, New York's Kips Bay Plaza apartment slabs, and Philadelphia's Society Hill (but Mies used steel, aluminum and glass, Pei used concrete and glass). None of these are among his very best works, but they show a disciplined intelligence, struggling and succeeding at the task of forcing design quality into the economic straight-jacket of speculative real-estate development. As real-estate projects, all four of these remain head and shoulders above their contemporaries.

Pei reflects:

But I find Mies' approach somewhat rigid. 'Skin and bones' architecture does not offer the kind of volumetric and spatial possibilities I was seeking. So we looked into Le Corbusier's work and to a lesser extent, Aalto's and Frank Lloyd Wright's. I think the influence of Le Corbusier was the strongest, for we found in his work sculptural possibilities. Our interest in the use of concrete started about that time, as it is a material that permits one to express volumes.

Both Le Corbusier and Mies van der Rohe were both preoccupied by the past even while they engaged in the development of an abstract non-historical manner. Le Corbusier created a classical building at Villa Savoie at Poissy in 1929-31 without using a classical vocabulary but at the same time rejecting the literal techniques of revivalism and eclecticism. Historical references bring to mind the Doric order of the Parthenon not by imitating or creating a new design technique but through the decisive reinforcement of Le Corbusier's own modernist aesthetic. His vocabulary is borrowed from contemporary forms of an ocean liner's superstructure set into landscape. As a contribution to the growth and culmination of the International Style,
the structure is without peer. It is one of the great spaces that I. M.
Pei consciously attempts to achieve in his own work. The spiritual
suggestiveness of this Mediterranean tradition can transport one back to
Hellenistic Greece or Palladio's Villa Rotunda in Vicenza. Although the
spaces of these two villas have literally nothing in common, each interior
provides a visual framework and bodily shelter for its human occupants that
establishes an extraordinarily similar relationship between man and his
environment. 31

Mies van der Rohe created the German Pavillion at the Barcelona
Exhibition of 1929, with the ambiguous effects of surface and space. Using
a simple grid pattern of vertical columns, both vertical and horizontal
ceiling and wall slabs and glazed areas, he investigated the relationship
between solid forms and surrounding space. As Mies looked to a more
structured rationale of modern architecture, he experimented with the
spatial flow across the surface of solid and glazed areas. The post World
War II period saw the rise of his work. Pei points to Mies as his most
enduring influence:

Mies was important to me personally in the 1950's, Why? Because
of the challenge I had then of working for Zeckendorf. It was
a very limited palette, dealing with low-cost housing... For that
reason, Mies' way was the right way. Simplicity of spaces and
forms, no need for that. If you want to build economically, Mies
showed the way because he made it possible for us to build simply
and with refinement.

Mies, this Behrens' student and Bauhaus master, defined the image of the
office tower that in turn defined corporate America. He was the right man
in the right place at the right time to stylize the glassy, air-conditioned
skyscrapers that erupted in downtowns all over the world. News travelled
fast and his black-painted steel and glass houses on Chicago's Lake Shore
Drive gleamed at night like thirty story lanterns lighting up the lakefront skyline and architectural history. He startled New York by setting a ninety foot deep plaza in front of the Seagram Building in 1959, thus adding a human element to Park Avenue and the genre of the skyscraper. He created an architecture of unadorned structure that embraced clarity, serenity, order and balance but left room for asymmetry and dynamism. With painted steel and wrapped glass measuring 120 X 220 X 18 feet, he created a great space at Crown Hall at the Illinois Institute of Technology by suspending the roof from four enormous girders supported by eight columns encased in crystal. This "universal space" designed to adapt to varying uses and changing needs proved "form need no longer follow function." He announced a universally convenient form--the box--into which various uses could be fitted. 33

In 1952, the firm learned its first lesson in urban design with the development of the Mile High Center in Colorado for Webb & Knapp. (See Fig. 2.1) Sparking a major downtown revival, the project consists of a combination of a prestigious new glass and steel office center with an innovative department store/restaurant connected to a hotel. All three buildings are joined with a common parking garage and are accessible by glass covered bridges. The heavily textured concrete facade of the hotel reflects the color and feeling of the Rockies to the west because of the reddish brown crushed granite aggregate that has been mixed with the concrete. As a stimulating focus, this development has played an important roll in rejuvenating the central area, and has shown how a commercial venture can be combined with civic responsibility. Promoting this "mixed use" concept that created generous urban spaces and generated further high
quality development and higher tax revenues, Denver continues today as one of the most active urban areas in the country. 34

This most successful grouping of buildings was refined in 1962 in Montreal, Quebec at the Place Ville Marie (PVM). In the face of "expert" skepticism, Zeckendorf's architects gave his vision a persuasive form in a seven-and-a-half acre project financially sound for its investors and economically and socially beneficial to the city while resolving existing problems on a city-wide scale (Fig. 2.2). From a central sunken plaza rises a forty-story office tower, sheathed in glass and aluminum, cruciform in shape, topping a multi-layered platform containing a pedestrian shopping concourse with vehicular service routes on lower levels. This Rockefeller Center-type-complex extended northward and southward to create a huge urban organism that tied together office buildings, hotels, department stores, and other existing (or planned) downtown facilities by means of a remarkable circulation network that new and old transportation systems (suburban railroad lines, the Metro, the Trans Canada Highway, buslines, etc.) and sorted them out on separate levels. 35 Designed by Henry N. Cobb, Pei's partner, and supported by independent planner, Vince Ponte, the project is a model of restraint from landscape treatment, to building design, to use of commercial signs.

Place Ville Marie, a powerful generator of urban form, has profoundly changed the direction of Montreal's growth. PVM established I.M. Pei & Partners more solidly on the urban design scene than any other single effort the firm has undertaken. Years after its completion, urban designers are offering incentives to private developers if they agree to
plug into mass-transit facilities, to create pedestrian systems and to provide shopping facilities. Without any official planning legislation to back them up, I. M. Pei & Partners achieved much of this basic integration of the urban infrastructure through the only clout they had at their disposal: persuasive designs and urban diplomacy. Along with these two achievements, the firm has become more deeply involved in the design of urban housing.  

With the introduction of the National Housing Act of 1949 and with the idea of improving housing standards, the firm concentrated their efforts in the technological area: they introduced glazed walls, established more generous room standards for living rooms and interior kitchens and integrated architectural concrete systems, in which wall and structure are one. Their involvement, and commitment has led the firm into the exploration of modern concrete technology—pre-cast as well as cast-in-place.

Kips Bay, completed in 1962, is located in mid-Manhattan, amidst the brownstones of an old Italian neighborhood (Fig. 2.3). Miesian in its inspiration because of the static ordered space and repetitive form, Kips Bay is made up of two exposed concrete slab buildings each 400 foot long separated by a 300 foot long park area. Pei left open areas at each end of the site so that intense static space could at least imply movement. The structures are reminiscent of Le Corbusier's Unite d'Habitation in Marseilles of 1946-52. Like Le Corbusier, Pei tackled the problem of urban living. Unite d'Habitation was designed as a shelter for 1,400 people within one single monumental, seventeen story slab elevated on "pilotis"
with individual apartments offering a maximum of privacy and convenience. It shows a tangible realization of the architect's thought and experience with respect to problems of individuals in relation to urban living. 38 Pei, in an effort to contain costs, speed up construction time and produce a more refined residential expression as an alternative to the mediocrity of most apartment buildings today, developed a basic system of load-bearing, reinforced concrete screen walls that serve both as structure and, with glass infilling, as facade. The twin, twenty-one story apartment buildings for Kips Bay Plaza were the prototype for this system. The structural frame and its careful proportioning is the architectural expression, and it is accentuated by the strong shadow lines on the recessed glass plane. Pei is very sensitive to the charge that he is an "expensive architect." As Kips Bay cost less than twelve dollars per square foot, it proved, said Pei, "that architecture can compete with non-architecture economically." Both city agencies and industry told the architects that exposed concrete structures were economically and structurally impossible. I. M. Pei & Partners did it anyway. Today, these construction methods are widely used in many cities. 39

The Society Hill project (Washington Square East) of 1964, in Philadelphia, Pennsylvania is part of a comprehensive urban renewal of the area adjoining Independence Hall (Fig. 2.4). The focus of Pei's scheme is a cluster of three, thirty-story apartment towers, whose handsome, well-proportioned structure and wall construction are a lightweight concrete refinement of Kips Bay Plaza. Although space between them is a mere 180 ft. across, building placement allows for ease of movement and flow. Creating the three structures presented a particularly complex
design problem because of the need to respect the scale and character of
the eighteenth and nineteenth century buildings which were to remain in
this area slated for urban renewal. Inviting the nation's largest
developers to submit plans for this area, the city's fathers stipulated the
retention of the old historic houses, but pledged the architects to build
new, individual townhouses as well as tower apartments, greenways, walks,
parks and fountains. Design, style and scale were to be most important.
I. M. Pei won the competition. 40

Among the firm's housing efforts, this project is the most complete in
scope, the first to be consciously woven into an existing urban fabric and,
for the first time, had the total cooperation of housing and planning
authorities. By combining modern high-rise apartment buildings and new
townhouses to complement the restored historic homes, the city hoped to
create a strong residential area that would lure back into the downtown
area families that had moved to the suburbs; preserve more than four
hundred old and historic houses; thus halting decay of the center city;
and attracting tourists to the area adjacent to Independence Hall. 41 Pei
says:

Housing has been an unusually difficult problem for architects
because of the disparity between building costs and the rents
that can be charged. Therefore, we used one-step concrete
construction in which the structural frame for the building is
also the finished facade. This way we were able to achieve the
desired esthetic effect while remaining competitive in cost with
conventional buildings, where the supporting structure is covered
with a face material. 42

This demonstrated that exposed concrete was an acceptable building material
but more importantly, an acceptable material for highrise structures.

The major stylistic developments occurring with Pei and his firm during
this period were primarily economical and technical innovations. By
intergrating his architectural forms into their context, be it on a massive urban renewal scale or seen as a community-generated core for development, or as a component part of the interior spaces created, Pei addressed the site. By attempting to combine Mies van der Rohe's universal space with Gropius' honest approach to form, Pei developed construction methods which redefined technology. Through inventive use of material, namely concrete, not only was the bottom line met, but human needs were fulfilled.

Pei's first commission independent of Zeckendorf was for the twenty-one story Earth Science Center (The Green Building) at M.I.T. in 1964 (Fig. 2.5). It shows a continuation of Pei's interest in a clearly-expressed and refined reinforced concrete frame, as a pragmatic aesthetic for tower structures. Each floor is a column-free space with the "bearing wall" along the sides. Solar-bronze plate glass windows are fitted directly into the poured concrete frame, which contains a limestone aggregate to produce a color and texture similar to that of the existing buildings. The Green Building breaks with the M.I.T. tradition of continuously linked five-story buildings. Since it would be a very visible landmark, Pei also wanted to restate the classical theme of the campus that had been earlier expressed in M.I.T's symbolic dome, but at a new scale and as a product of our technology. The entire structure was constructed of exposed concrete poured-in-place, using special precision forms made of plastic reinforced with glass fibers.

Pei's first personal expression in years (in the past he had always looked over the shoulder of other architects working for him, participated in the concept and occasionally drew a line to test out an idea) was the
National Center for Atmospheric Research in Boulder, Colorado in the early 1960's (Fig. 2.6).

In a great many ways, despite all of the moving critical acclaim for that mountainside cluster, it was a startling experience - and, for me, it's a somewhat deficient design. I began to know how little I knew, and, finding that out, I acquired an appetite for designing more, much more. I slept in a sleeping bag on the site, getting the full force of the elements and the atmosphere and the spirit of the place, and I realized, all over again, how intensely personal the process of design is - not personal in the sense that you insistently look for a way to assert your own identity, but in the sense that you have to find the way for circumstances to assert themselves.

Finding inspiration in the thirteenth century ruins of the Anasazi Indians while touring Mesa Verde National Park, Pei conceptualized their shape, color and texture into non-articulated somewhat monolithic forms. With an aggregate taken from the mountains themselves, Pei used poured-in-place concrete for this structure set on a spectacular site against the backdrop of the Rocky Mountains. The firm used good sense in both practical and aesthetic terms in their handling of the concrete, although they experienced minor problems of detail and finish.

We have really done a lot of pioneering work in exposed concrete and we may have made some mistakes. But I think we have learned a tremendous amount from our mistakes--and from our successes as well. I really think we know more about how to handle and mix and finish exposed concrete today than any body else.

As Pei established his own practice, he sought to develop his own expertise in design. The hands-on Zeckendorf years were balanced with this conceptual approach tempered by a reverence for historical reference. He experimented with the shape, color, and texture of new form as well as handling the medium of concrete with a level of virtuosity that created an art form.
Along with concrete technology, the firm has made headway in another area— in the creation of glass- and- metal curtain walls for speculative and corporate office buildings. The project at 88 Pine Street is a well conceived aluminum- and- glass office slab completed in 1972, in New York City (Fig. 2.7). This unpretentious building, which measures 198 ft. wide, 86 ft. deep and contains 32 stories tall with an elevator core and glassy lobbies, stores, and banking spaces on the ground floor and a lower level concourse ready to be connect with a planned subway, as well as nicely planned and paved areas around its exterior. With its straightforward appearance, economical construction, and elegant composition, 88 Pine Street is the prototypical, late twentieth century American office tower. The distinct white painted aluminum elements frame extremely wide mullionless glass windows, giving a hard- edged detailing to this structure's surface and bringing Mies van der Rohe to mind. The elegant proportions and attention to construction details in the structural bays give the building a sophistication when compared to its mediocre curtain- walled neighbors.46

At the same time as the construction of 88 Pine Street, the Pei firm was working on another glass curtain- walled project. In 1967, when the John Hancock Mutual Life Insurance Company, as an important landowner and employer in downtown Boston, announced that Copley Square would be the location of its new headquarters building and that I.M. Pei and Partners would design the project, the Boston Architectural Establishment erupted in loud opposition. The main complaint was that any possible tower on the site would overpower two existing Copley Square landmarks, H. H. Richardson's 1877 Trinity Church and McKim, Mead and White's 1895 Boston
Public Library; it may be, as well, that Boston architects—and there may be more architects per capita in Boston than anywhere else on earth—resented such an important commission's being given to a New Yorker. The opposition failed however; Hancock got permission to build; Pei's partner Harry Cobb, a native of Boston, headed the project; and the result, as Pei's fellow architects should have expected, was a triumph of intelligent response to the building's context. The new tower, rhomboid in plan, thin, angled, and mirrored, presented a minimal edge toward the square; its reflective surfaces duplicated, rather than dominated, its distinguished neighbors; and its attention to siting opened to a new public plaza a facade of Trinity Church that for years had faced only an alley-sized street. It was a triumph of site integration (Fig. 2.8).

Architect-critic Peter Blake, Chairman of the Boston Architectural Center, has called the Hancock Tower "a textbook example of the way these architects function: in more insensitive hands, such a building could easily have wrecked a historic square; in their hands, it preserves and enhances it." In 1977, the American Institute of Architecture gave the tower its Honor Award (Pei's 16th). And even Jean Paul Carlhian, a partner in the prestigious Boston architectural firm of Shepley, Bulfinch, Richardson and Abbott and one of Hancock's earliest and most outspoken critics, has acknowledged the building's success (a public change of heart that Pei and Cobb admire and appreciate).

There may have been no doubt about the brilliance of the architectural solution, but during construction a few sheets of glass broke and fell from the facade, hitting a number of others on their way down. No one was surprised at first; few buildings of such size fail to have some breakage
during the building process. But breakage continued and grew worse. By the winter of 1973 it was evident that something was seriously wrong. That June, the architects presented their analysis of the situation of Hancock, and shortly thereafter every pane of glass in the tower was replaced. Pei's reputation was as shattered as the building, and clients stayed away in such numbers that the firm, which was by then already established in the front rank of American architectural practices, began to fear for its survival. The glass problem was resolved (litigation pronounced blame on the manufacturer in 1974) and the firm's reputation was saved.49

The Tower will continue to demonstrate the superb work that can be accomplished when architecture is combined with urban self-renewal. The firm's use of reflected glass creating a mirrored image is striking while it allows the building to "disappear," which preserves the historical integrity of the district to remain. Now that things are calmer it is no surprise that the Hancock has become quite respected, even beloved, by Bostonians. This building is a monument to its chief designer, Harry Cobb, his generation's most completely self-effacing architect. Even critic Charles Jencks calls it a "late modern masterpiece".50

As Pei respects the existing fabric of surrounding buildings, he also respects his fellow architects. One architect, who has competed with Pei for many jobs, credits Pei's willingness to share responsibility as the main reason for the office's stability; "Pei really let 88 Pine Street be Jim Freed's building, or Boston's Hancock be Harry Cobb's. That is how you keep good people; by giving them a share of the work and not denying a share of the credit."51 When 88 Pine Street won the prestigious R. S. Reynolds Award, for example, it was Freed, not Pei, who received it. On
the other hand, Pei did not hide behind Cobb when the Hancock began to cause problems. He recognized that it was his name on the blueprint, even if the design was largely Cobb's, and he "did not flinch from the slings and arrows that came the firm's way during the long period of anguish surrounding the tower's tumbling windows."52 Pei himself is involved in determining the basic concept for virtually all of the firm's designs. Pei follows some of them through to completion, but he also devotes a great deal of his time to traveling and seeking clients for future work, a habit he got into when the Hancock problems forced him to spend as much time doing public relations as designing. It was a large amount of international work that kept the firm in business during those difficult years when the John Hancock Tower was the largest plywood structure in the world. While Pei now says that he would prefer to be doing more smaller-scale work closer to home, so as to allow him to become more personally active in design enough overseas work remains for him to keep active world wide.

One of his most famous foreign projects is the Oversea-Chinese Banking Corporation Limited—one of the major banking institutions of the Far East (Fig. 2.9). Pei's Centre serves as the head office and banking hall for the Corporation, providing a premises for related and affiliated companies, and rental offices for selected businesses and professions. The site contains approximately 70,500 sq. ft. within Singapore's prime business district which has been named by government planners as the "Golden Shoe" area of the city. The Oversea-Chinese Banking Centre, completed in 1973, is an immense tower of light, sandy-colored granite with rounded ends and windows set into a solid mass in three great 13-story chunks. Both as a
statement of banking functions and as a majestic tower for the entire city, it is a building that is at once structurally expressive and symbolically valid ala Courbusier. The Centre, which has several Pei-designed neighbors, has a luxurious quality and probably vies with the Hancock Tower for the position of the Pei firm's finest and most original skyscraper.53

As Pei's general aesthetic sensibilities pervade the firm's day-to-day work activities, he accommodates the creative efforts of his partners as they progress technologically by synthesizing his respect for site, context, and historical reference. Pei broadens his palette with the inclusion of the hard-edged glass-curtained wall as a new medium and capitalizes on new surface treatment, texture, and decoration. This new attention to surface is evident in the direction the firm is taking: the application of paint to metal (color) is one departure; the geometric and reflective repetitive pattern is another; while the addition of ornamental structure is the third.

Looking back on the building in the 1950's and 1960's, Pei says that:

it was a period of great opportunities. We had almost continuous building activity for almost two decades. This created a generation of architects who had little time to reflect. It was a generation of practitioners, putting the ideas of Le Corbusier, Mies and others into practice. It was a generation that said, 'The revolution is won. Now let's roll up our sleeves and get something done,' I belong to that generation.54

Pei's buildings have a formal coherence, a quiet unity and harmony in the spirit of Mies's universalism, which he successfully combines with a sensitive response to specific needs. His rigorous analytical approach to resolving the complexities of a building, while it produces a highly-disciplined and simple geometric order, clarifies the complexities without
negating them. Pei has been aptly described as combining a classical sense of form with a contemporary mastery of method. He would be sympathetic to Mies's statement, "I would rather be good than original." Pei considers architecture and planning as one; the design of buildings and spaces as an entity. His emphasis on total planning and the restrained, rather formal, refined statement related to it, is timely in view of the great need for a sense of unity, direction and purpose in our cities.  

At this time in his career, Pei has said, "It is Louis Kahn whom I admire most. He will stand the test of time--there is a spirit, a sense of being in a very special place in his buildings. From him I learned that it is not just a concept, but the way that concept is executed that is important". He credits Kahn's design capabilities to his Beaux-Arts background. Steeped in the history of architecture, Kahn's "architecture of ideas" went beyond the first generation of modernists, creating new form by adapting forms of the past. "In my opinion, Kahn's Salk Center comes close to being an ideal building. In a formal sense, he and I were probably equally concerned about form. Though, I think Salk Center is much better than (my) National Center for Atmospheric Research, the formal concerns were the same."

Like Kahn, Pei has designed a number of museums beginning in the late 1960s. Each is a reflection of the progression in stylistic development on a similar theme. The first was the Everson Museum of Art, Syracuse, N.Y. (1968); then, the Paul Mellon Center for the Arts, Wallingford, Conn. (1972); the Johnson Arts Center at Cornell University, Ithaca, N.Y. (1973); the most recent is the National Gallery of Art, East Building, Washington, D.C. (1978).
For the Everson Museum of Art, Pei refined the poured concrete shapes from his National Center for Atmospheric Research to create four main galleries, spatially varied around a central sculpture court in a closed sequence (Fig. 2.10). Moving to the Paul Mellon Center for the Arts (Fig. 2.11), Pei played intriguing games with geometry by carving out two overlapping squares—the auditorium with a curve, the teaching area at 45 degrees to create two solids around a central diagonal void. These sculptured concrete forms set the stage for a dialogue between opposing positive forces. The spectacular form of Cornell's Johnson Art Center is spectacularly sited terminating a long open space sloping up to it and overlooking a gorge (Fig. 2.12). The building is constructed of tan concrete with pours as long as 60 feet and as high as 20 feet, minimizing construction joints to give a monolithic effect. Consisting of four levels, its most prominent feature is an open space at the third one. Around this central void, the building is divided into three elements: the open spaces of the public areas, the tower housing offices, and the projecting roof/sculpture terrace with its commanding views.

The East Building of the National Gallery of Art, which opened in 1979, is the culmination of these museum design projects. It infers the geometry of its trapezoidal site, adjusting itself to the scale of Pennsylvania Avenue and of the Mall (Fig. 2.13). This geometry is articulated by the interlocking and interplay of two basic triangles—an isosceles section containing the exhibition areas, and a right triangle containing the Center for Advanced Study in the Visual Arts. The isosceles section is entered from Fourth Street, passing a burnished bronze by Henry Moore, symmetrically aligned 380 feet across a new plaza from John Russell
Pope's original Gallery building of 1941. Also in from Fourth Street is the entrance to the Center, through a deep indentation which not only introduces the section composed of the right triangle but also a subtle but definite shift to asymmetry in the direction of the Mall. The grammar of marble and concrete is clearly, cleanly enunciated. The concrete has an aggregate of the marble mixed with it for color continuity. Pei wanted to use the same Tennessee marble as in the original building with stones of the same size (2 ft. by 5 ft.), joints of the same size (1/8 in.), and even color graded the same way (darker at the base, lighter at the top of the wall), but without the older building's pilasters and changes of plane, in surfaces as long as 400 ft., and without expansion joints. The ingenious solution avoids the accumulation of expansion movements in large surfaces by allowing each stone to move independently, while keeping joints thin and watertight with a special neoprene gasket developed by the firm (Fig. 2.14)\textsuperscript{59}. The building has not been without its critics however. Although recognizing Pei's efforts to use conforming materials, Robert Stern finds the East Wing suffering from "a kind of disease of the 1970's--acute diagonal analysis of form" which makes it incompatible with the tradition with Pope's structure and other surrounding buildings in the Capitol.\textsuperscript{60} Others have criticized the vastness of the courtyard space in contrast to the galleries themselves, appearing tucked into the corners or put in the basement.

Space, light, and movement--both spontaneous and processional--are the reality of the courtyard rising 80 feet above the concourse-level entrance to the exhibition areas (Fig. 2.15). Looking up into, or across, the
courtyard, the four-foot-thick floor levels and post-tensioned bridges overlap and interconnect at various points as people thread in and out of the four gallery levels. Grand stairs from the concourse, and a second sweep up to the mezzanine give way to a run of escalators leading to the third, major level with a terrace cafe, the second bridge sweeping across the northeastern area of the upper courtyard, and the larger ranges of gallery space. People are everywhere, seeing and being seen. "Museums are no longer just for connoisseurs. Public interest in museums has risen so rapidly lately that they have become much more than storehouses for art; they have become also important places of public gathering."61

Entering the exhibition area either from the plaza on Fourth Street or by a low tunnel leading to it from the cafeteria below the plaza, the upper galleries are unfolded within three "houses" or "pods," one rising up from each of the three corners of the isosceles triangle encasing this section. Each "house" is a parallelogram, with elevators or spiral stairs set into the corners, and the healthy room-like scale of the galleries is thus arranged, with great flexibility of expression and installation, within basic hexagonal hollows within these "houses." Walls are freshly built to suit the scale or spirit of the art being shown, both enclosure and culture looking permanently at home; the uppermost ceilings in each "house" are freshly adjusted, up or down, assuring apt vertical scale.62

The second major section of the East Building is the Center for Advanced Study in the Visual Arts, its six stories rising around a reading-and-reference hall that recalls, without literally rendering, a medieval library. Its entrance, like those of the adjacent exhibition area, is low, compressive, and anticipatory, releasing movement and vistas
that are illuminated by light coming in from the southeast and southwest, but still defined by the enfolding presence of the concrete edges of floor dramatically dovetailed with the bounding walls of marble. This space, seventy feet high, is also edged with book stacks and scholars' offices which, rather than stuck off somewhere, fully share in the light and loftiness of the hall. The uppermost level of the Center is taken up by administrative offices, a board room and a refectory that are interconnected by a passage running past an outdoor terrace and a skylit stairwell. Variations of the triangle permeate the place from the configuration of the skylights to the deeply recessed coffers of the ceiling down in the concourse-level auditorium.

Pei believes that there have been basic changes in approach and form in his work during the 1970s. "Both the Everson and the East Building are exercises in form and space. I think, however, the East building is more successful contexturally. Its space is more whimsical in character, while at the same time more complex because of its multiple vanishing points."

A brilliant example of civic planning, the East Wing is the most strongly organized and most flexible of Pei's buildings for the arts to date. In its technical expertise as well as in the strength of its design, this modern structure is a superbly controlled statement. Its disciplined geometry and clear plan provide a masterful environment for private study and public delight. Yet, some, like Robert Stern, find the interior space more like that of a suburban shopping mall than a museum and inappropriate for the contemplation of art. The vastness is overwhelming even to those works of art commissioned for the space. The movement and confusion can leave the visitor wondering where the art is (or where the shops are!).
As the Pei firm continued to design public buildings, a new kind of concern entered their work—the symbolic one. The John F. Kennedy Library is an example of this more conventional kind of modernist monumentality, which opened the same year as the East Wing of the National Gallery (Fig. 2.16). The building is a throwback, in part, to Pei's earlier work. The library is a powerful set of geometric forms, a strong masonry box, sliced at the diagonal by a square box of glass supported by a space-frame metal truss. The glass box contains an immense, open space within; it is a room of considerable drama. It works because of Pei's ability to marry great space to bold geometric form. Upon entering, one is given a tantalizing balcony view into the building's main space—a soaring volume almost completely glazed—but, once we enter one of the two lens-shaped auditoriums and, after a half-hour film, descend to the lower level exhibition area, our focus is not on architecture, but on John Kennedy—his family, his P.T. boat, his Presidency, his rocking chair, his assassination—his symbols.

Exhibits designed by Chermayeff & Geismar present a rich collection of papers, pennants, costumes, furniture, cartoons, television clips and photographs. One emerges at last from this avalanche of detailed and often emotionally charged memorabilia into the serene blankness of the building's main space, and the emergence is one of the most refreshing and releasing experiences modern architecture has ever provided. Except for a few plants and a giant American flag high above, the space is unfurnished. It is not
a space meant to serve any utilitarian function, nor is it meant to be studied for its own interest as an architectural wonder; it is meant simply to lift our spirits and invite us to a few quiet moments of reflection. Although vacant, the space capitalizes on its view over a contemplation-provoking panorama of water, with the Boston skyline far in the distance. It is a space in which to stay for a while.\textsuperscript{68}

Design is very important to I. M. Pei, yet, in many areas he has accepted the fact that a certain amount of standardization is necessary within the current uses of technology, and yet he will not allow his firm to become standardized to the extent that Skidmore, Owings and Merrill is, despite his admiration of their technological accomplishments. Every building designed by Pei is remarkable for its emphasis on the refinement of design. In other words, Pei seeks the interest of the client rather than seeking to express himself. Pei's interpretation of Louis Kahn's statement "to build is to express" is "to build is to perfect." Kahn expressed his philosophy in his building design, but while Pei understands the importance of a philosophical approach, he also knows the limitations of a practical nature that occur. In other words, Pei's philosophy seems to fall somewhere between that of SOM and Louis Kahn. Pei perfects the building functionally and emphasizes the total planning and the restraint rather than the philosophical statement related to it. He combines classical form with modern technology.\textsuperscript{69}

And that may, of course, be the chief reason the firm continues to attract so much exceptional young talent. Really good, young
architects seem to realize that I. M. Pei & Partners, despite their obvious fashionableness, are not "Establishment Architects" in the ordinary sense of that term. They are, as Voltaire would have put it, architects in search of the best of all possible worlds, rather than advocates of dreams.
Fig. 2.1 Mile High Center
Fig. 2.2 Place Ville Marie
Fig. 2.3 Kips Bay Plaza
Fig. 2.4 Society Hill
Fig 2.5 Green Center for the Earth Sciences
Fig. 2.6 National Center for Atmospheric Research
Fig. 2.7 88 Pine
Fig. 2.9 Overseas-Chinese Bank Building
Fig. 2.10 Everson Museum of Art
Fig. 2.12 Johnson Art Center
Fig. 2.13 National Gallery
Fig. 2.14 Neoprene Gasket
Fig. 2.15 East Wing (Interior)
Fig. 2.16 J.F.K. Library
NOTES

1 Exact dates not available.


5 Ibid., p. 61.


8 Ibid.


10 I. M. Pei Fact Sheet, I. M. Pei & Partners Office File, Dallas, Texas.

11 Ibid.


16 Ibid., p. 12.

17 Ibid., p. 18.

18 Jacobus, Twentieth-Century Architecture: the Middle Years 1940-65, p. 15.

19 Ibid., p. 16.

28 Ibid.
31 Jacobus, Twentieth-Century Architecture: the Middle Years 1940-65, p. 22.
32 Barbaralee Diamonstein, "I. M. Pei: The modern movement is now wide open," Art News 67 (Summer 1978), 67.
35 Ibid.
36 Ibid.
37 Ibid., p. 69.
38 Jacobus, Twentieth-Century Architecture: the Middle Years 1940-65, p. 59.
41 Ibid.
42 Ibid.
43 Heyer, Architects on Architecture, p. 315.
44 Dean, "Conversations: I. M. Pei," p. 66.
46 Ibid., p. 37.
48 Ibid., p. 20.
49 Ibid., p. 22.
50 Ibid., p. 23.
51 Ibid., p. 24.
52 Ibid., p. 25.
54 Dean, "Conversations: I. M. Pei," p. 65.
55 Ibid., p. 64.
57 Dean, "Conversations: I. M. Pei," p. 64.
61 Marlin, "Mr. Pei Goes to Washington," p. 84.
62 Ibid., p. 86.
63 Ibid.
64 Dean, "Conversations: I. M. Pei," p. 66.

66 Stern, Pride of Place, p. 245.


68 Ibid., p. 88.


CHAPTER III

THE DALLAS MUNICIPAL ADMINISTRATION CENTER

Dallas City Hall, designed by I. M. Pei & Partners in association with Harper and Kemp of Dallas, is a structure that is a dramatic expression, visually describing the confidence of a city in itself\(^1\) (See Fig. 3.1). The Dallas City Hall and its park plaza embody familiar and perhaps even old-fashioned values: monumental scale, studied formalism, structural daring, thoughtful detailing and a heroic, futuristic stance. New York Times architecture critic, Ada Louise Huxtable, has said that Dallas' City Hall complex and Boston's Government Center, both designed by Pei's firm, are "undeniably among the most interesting urban constructions of the 20th century."\(^2\) Located at the southern edge of the Dallas Central Business District, City Hall is a building that relies on the impact of its daring cantilevered form and its bold horizontal thrust to contrast with the somewhat clustered, vertical office towers that dominate the CBD. Its design is a dynamic symbolic gesture, which is monolithic in character.

In hopes of realizing a cohesive downtown civic district, Dallas Mayor Erik Jonsson spearheaded a 1964 recommendation by an elite citizen's committee for a new City Hall to adjoin the 1957 Convention Center. In August 1966, the "Committee for the Design of the City" made this proposition:

It is not sufficient that Dallas be merely efficient. A rich and rewarding urban life for Dallas people requires the environmental necessities of order, cleanliness and beauty.
A 1960's master plan called "Goals for Dallas" plan went on to state:

Public agencies as a group are a major determinant of city appearance; and their development of land, buildings and facilities should set the example for others. But, a standard needs to be raised for the example-setters. The City of Dallas should take the lead in seeing that its buildings and facilities represent the highest attainments in civic and design excellence, and having established its performance, demand at least equal performance from all other public agencies.

In February 1966, I. M. Pei & Partners came before the committee, as a result of the committee's survey of architects who had recently been employed by the twenty largest United States cities. Especially known for their work in Boston on the Government Center, I. M. Pei & Partners, along with the local architectural firm of Harper and Kent, were interviewed and contracted for the design of Dallas City Hall. Pei told the committee his approach to the project would begin through an environmental study of the entire area and its relationship to the city, before designing anything. But, he did agree with the committee that the addition of a new City Hall building in that area could be a generator of public and private renewal in Dallas; and that Mayor Jonsson's vision of the structure should be "a monument to the city's pride, a symbol of a first-class city that is reaching for greatness."\(^5\)

In 1967, the Dallas voters appropriated $42.4 million for Dallas' eleventh city hall building, its construction, building site, parking facilities, and additional land for a park - the result of a recommendation by Pei: "Why should such an important civic building look out at a drug store, a parking lot, and a pawn shop?"\(^6\) The building was slated to be finished in 1972, but it was not until that year that construction began.
The project had been no sooner launched when problems began to appear. First, the city realized that it had underestimated the cost of the parking garage and the jail facilities, both to be located underground. In 1968, the proposed parking garage was reduced in size and jail facilities were dropped entirely to conform to budget restrictions. More delays were caused by over-budget rounds of contract bidding, a succession of strikes, revisions, suits and counter-suits, and inflation and refinancing of the bond package; but this allowed Pei more time for further refinement of his design, experimentation with materials, and innovation in engineering approaches. When the building was officially opened on March 12, 1978, it had been delayed six years and its projected costs had run $14 million over budget.

Certain specific features were influential in the conception and design of City Hall for Pei. Government is spelled with a capital "G" in "Big D." Since a city hall is a special use building, Pei knew it should be tailor-made for those uses. Because Dallas operates its Municipal services in a unique way, the resulting building looks unique.

Actually, before we started to design the building, we received a fairly complete program from the City Administration. This program is so complete that we had very accurate ideas about floor to floor distribution, the number of work stations on each floor and the kind of functions that are likely to happen on each floor; so that at one glance, we could immediately see that if we tailor-made this building to the needs of your City Hall, this building will have more space on the top floor than on the ground floor. This is known: the ground floor is public access, while the top floors are for the clerical or engineering staff who work best in terms of efficiency if they are not on separate floors.

Consequently, as different departments are different sizes, the square footage of the floor they occupy should vary accordingly.
Dallas City Hall is actually a skyscraper placed on its side, anchored at the southern end of the CBD. It is bordered by Akard, Evray, Young and Canton Streets and adjoins the Convention Center site. The most dynamic aspect of this 770,000 sq. ft., cast-in-place concrete structure is its trapezoidal shape, dramatically defined by the cantilevered front face of the building. This overscaled trapezoid, situated at the rear half of a rectangular, ten acre site stretches 560 ft. in length and rises to a height of 122 ft. from ground level. The sloping front of the building faces north to the vertical skyscrapers of the CBD. As the building's face angles 34 degrees out and away from perpendicular, it increases the depth of the roof area to 194 ft., versus the 126 ft. depth of the base area at ground level. This design increases the depth of each of the above grade floors by 9 1/2 ft. in arithmetic progression, enabling an agency and its support staff to be located on a common floor (or a part of one), which is in ratio to their collective size, and which accommodates their total space requirements. The design, thereby structurally imitates and facilitates the operations of the city's government, a lesson in form follows function instilled by Gropius (Fig. 3.2). There are eight floors above grade, the first seven of which provide public areas and office space; the eighth houses the building's mechanical equipment. Two floors of additional office space extend below grade and abutt the two-level, 1,325 car parking facility beneath City Hall's park plaza. The east and west facades (the mirrored-L-shaped ends) and the rear south face, cantilever outward, but these faces of the building are stepped-out, overhanging each preceding floor, instead of forming a smooth inclined plane, as is represented by the front face(Fig. 3.3).
As Pei had stated, in designing City Hall, the environment should be a consideration; he had suggested that a public park in front of the structure would enhance not only the feeling of public accessibility and belonging in the community; but it would also form a relationship to and a dialogue with the cantilevered face of the structure itself (Fig. 3.4).\textsuperscript{11}

If you didn't have this situation, then the building can very easily be a straight and a conventional 90 degree kind of a facade. But, when you have this important kind of a relationship between the building and the park, then the building and the park must become one; and that cantilevered front, in our judgement, does just that.\textsuperscript{12}

The rectangular park plaza covers six acres and is handsomely composed. It is split into two levels by a concrete wall creating an upper triangular paved plaza and a lower triangular planted plaza. The rectangular park extends 425' out from the building and stretches 600' along the length of the building. The overscaled, symmetrically-planned, open space is livened by a variety of indigenous trees, areas of grass alternating with geometrically-shaped concrete patterns in the lower triangle; a 180' diameter pool is centered at the base of the upper triangle. Henry Moore's sculpture, "The Dallas Piece" stands in the center of the rectangle. The one color element is a bright red, free-floating sculpture by Marta Pan which dances through the water under a variable height fountain set in the pool's center.\textsuperscript{13} Cleverly, the park plaza's expanse camouflages the parking garage beneath. The park plaza's formal design and grand scale are reflective of the building's design and dimension. The concrete and glass, angled facade of the structure, projecting out and over the ceremonial park, mirrors the open space, greenery and activity of the plaza in its reflective windows, thus forming the dialogue intended by Pei.
Dallas City Hall had to be more than just an office building. We had to be concerned about people's perception of what the building should be. We chose to make it long and low, because we felt it should contrast with private institutional buildings. There was another reason for making it low. A public building has to have a public space, just as in front of a cathedral there's always a square. If you put a tower in front of a plaza, the plaza leaks everywhere and you end up with no enclosure. A low building embraces the plaza and makes it its own. So the search for the symbolic is very important in the context.

Placement of the site has always been a major concern of Pei's, as seen in two other projects from the same period: the JFK Library and the East Wing of the National Gallery. Contextually, the trapezoidal structure is comprised of six trapezoidal modular bays set horizontally in a row, forming the length of the structure. For purposes of clarity, in the descriptions to follow, the modules will be numbered sequentially #1 through #6, beginning with the first module on the left as "#1". Having the same depth at ground level and roof line as the building itself, the modules are each 65 ft. 4 in. in length and account in total for 392 ft. of the building's total 560 ft. length (Fig. 3.5a).

Three non-structural 37 foot 4 in. wide service cores, which are rounded at the front, are set at asymmetrical intervals along the length of the building's front (Fig. 3.5b). The cores extend into the building, appearing to hold the cantilevered face in place, yet they do so only visually. They serve to house the elevators and circular staircases at their rounded fronts. These three elevator cores total 112 ft. of the 560 foot length. The first core is placed between modules #1 and #2, and the remaining two columns flank each side of module #5, which contains the glass enclosed entrance to the lobby.
All of the modular bays, except for #5, have bases of blank concrete to a height of 15 ft., which results in a first story that is, to the eye, almost all un-relieved concrete. This also is not a structural function, but is an element of the design which provides a visual base to emphasize the single front entrance to the building at bay #516 (Fig. 3.5c).

There are four structural utility cores, 14 ft. wide, two of which divide the rest of the bays from each other (Fig. 3.5d). One utility core is between modules #2 and #3, the second is between modules #3 and #4. The remaining 2 cores are placed at each end of the building, one before module #1, and one at the end of module #6. These four cores total 56 ft. of the 560 foot length.17

Fourteen vertical transverse walls (front to back) which are steel reinforced concrete and load bearing, extend as they rise so that their edges joining the front of the building are flush with the cantilever (Fig. 3.5e). Six of these walls flank each of the three elevator cores. The remaining eight walls flank each side of the four utility cores. These fourteen walls also contain tensioned steel tendons attached to each floor slab. The tendons run vertically, from floor to roof, to tension and balance the weight of each floor level (vertical post-tensioning), and also contain the steel tendons that run horizontally from the front face of the building to the rear (horizontal post-tensioning). These horizontal tendons counteract the force and weight of the cantilevered front.18

Pei reflects:

Technology is part of our architects' art. Mastery of technology has to be a part of his training, however, technology alone does not make a great building. Engineers are there to solve a technical problem for you, but they are not there to solve the mysteries of architecture. That is the architect's job.19
Post-tensioning is a standard technique for stabilizing forces, however, two new methods were employed that make the engineering of this structure unique. The vertical and horizontal post-tensioning employs a looped-tendon technique (versus an end-to-end, tensioned tendon), that is the first known use of this method according to VSL Corp., Los Gatos, Ca., the post-tensioning subcontractor. This looped vertical post-tensioning is applied to floors three through seven (Fig. 3.6).20

In the vertical looped-tensioning, a pre-set anchor is attached at the floor level and empty "U"-shaped container conduits (ducts) are run through an anchor at the floor level, then one continuous tendon is looped through and both ends are then pulled, tensioned and grouted to a bearing plate at the roof level. This looping method simplifies placement and cuts cost with the elimination of an anchorage and a bearing plate. Also, by this method, if an 8 strand cable is required, a 4 strand cable twice the required length is simply looped, instead.21

The deviation from the standard technique in the horizontal post-tensioning was for aesthetic reasons alone. Normally, there would be a "block-out" (through-hole) in the front and rear face of the building's concrete wall, on the outside of which bearing plates would be placed, transferring the tension forces to the concrete. The bearing plates would be capped with "blockout cap" and covered with concrete. However, it was contended that with this method, blockout caps would mar the smooth front face of the building. Instead, the engineers again employed the pre-placed, fixed-anchorage method to the reinforced-steel skeleton, the "U" duct and the cables, before concrete was poured. The cables were then looped in stressed to the rear wall where they could be capped and covered,
"since the architects didn't specify the rear face to have the same smooth plane as the front."^{22}

The structure of Dallas City Hall is devised from the use of modules, reminiscent of Kahn's Salk Center. This ordering system and device for structuring a building also illustrates the mathematical ability of the architect's art.^{23}

Also of particular interest is that the building's scale and proportion is determined by a 56 in. sq. fiberglass modular form, precisely molded in the shape of a trapezoidal dome with flanges around its edge (Fig. 3.7). Seventeen thousand of these forms were used and reused in casting concrete to form the floor slabs. Fourteen of these 56 in. forms together span the length of a bay (56 in. X 14 = 65 ft. 4 in., the length of each of the 6 bays) (Fig. 3.8). The number of forms used, front to back, determine the depth of the floor. As mentioned, each floor extends progressively 9 ft. 4 in. farther than the preceding one (56 in. X 2 = 9 ft. 4 in.); therefore, the increase in depth of each successive floor is determined by the addition of 2 modules (Fig. 3.9). The domed (33 in. high) forms are precisely placed and anchored hollow side down, to the top of a plywood platform, forming a grid pattern. The platform is gantry (a crane used in construction) suspended at a determined floor height (Fig. 3.10). Floor-to-floor heights are determined by three module heights (56 in. X 3 = 14 ft.). The concrete is poured over the top of the forms and leveled to a flat surface. When set, the plywood and fiberglass forms are removed from below, resulting in a floor surface topside, while a coffered (domed) 33 in. deep ceiling results underneath at the level below (Fig. 3.11). Fiberglass was chosen from which to mold the forms, because of the dense, smooth finish it gives to the inside surface of the coffered ceiling and
because of fiberglass' durability to be used and reused in the pouring of additional slabs.24

However, this is not the only result, or purpose designed into this 56 in. sq. modular form. During the first pour over the modularly made grid floor form, steel cables have been strung across the domes' tops, and tensioned into the adjoining transverse walls spanning the width of the bay. When the concrete is poured to cover the 33 in. high trapezoidal domes with a 3 in. thick layer over its top, the steel cables (now encased in concrete) have become structural beams; and the 3 in. thick layer creates an intermediate floor slab (Fig. 3.12). Also, during that pour, an air slot was created, by voiding a part of the pour with a separate small fiberglass form. The air slot now passes from the coffered ceiling from below, through the top of the dome, and through the intermediate concrete slab (Fig. 3.12). Additionally, during that pour, a foam rubber pad was placed to form an indentation in the dome, which will hold a lighting box fixture. When the intermediate concrete slab is in place and set, concrete curb-shaped forms are placed over the top centers of each row of domes (Fig. 3.13). The curbs run the length of the bay, and after a second pour into these curbs, the resulting shapes on top of the domes are 8 in. deep troughs, that run from front to back of the bay. These troughs are vented through to the ceiling below, by the air slots that were voided (Fig. 3.12). A sheet of corrugated metal is laid over the troughs, enclosing them, and creating air plenums (air ducts) that run the length of the bay. These will act as the ventilation system for the floor below. Next, on top of the metal sheet, 3-cell conduits, containing electrical, telephone and computer signal lines are laid (which permit office partition flexibility).
Finally, over this metal sheet (that covers the length and width of the bay) and the conduits, concrete is poured again, and leveled to a 4 in. thickness, which is the floor slab surface. (Fig. 3.13) The coffered ceiling/slab floors are now 4 ft. thick (33 in. dome + 3 in. intermediate slab + 8 in. air plenum + 4 in. floor slab = 4 ft.). The end result of this modular process is: self-contained structural beams, light fixture boxes, a ventilation system for heating and cooling, electrical/communication signals, a floor slab above and an aesthetically appealing, coffered dome ceiling below.25

In addition, these modules determine the slope and scale of the cantilevered front: if three module heights determine a 14 ft. floor-to-floor height between levels (clear height, floor-to-ceiling is 10 ft. on each level), and two module depths determine each successive floors' extension; then a 2:3 ratio results and thus, determines the slope and scale of the building (all the mathematical purity of Mies van der Rohe). Remarkably, all of this is derived from a simple 56 in. sq. trapezoidal module, determining the scale of the six trapezoidal bays, and these modular bays, in turn, comprising the whole of the structure. Perhaps, the structure, comprised of six modular sections, and they in turn formed from smaller, repeated modular units (form), reflects, "the repetitive processes of bureaucracy" (function) within a democracy as a whole.26

Theodore A. Amberg, Associate Partner, I. M. Pei & Partners stated: "In our approach to designing buildings, everything that becomes part of the facade is subject to design considerations."27 In creating Dallas' monolithic structure, a brick facade was considered, but Pei insisted on a cast-in-place, concrete structure. Pei had been working with concrete
since becoming independent from Zeckendorf in the 1950's, and has set the industry standards for working with this material. The 20 story tower at the Earth Science Center, M.I.T., was an example of his monolithic experiments in concrete. Blending the concrete by color and finish to match the pink marble in the National Gallery of Art, then mapping of an entire quarry to achieve the right gradation of color in the marble, is an example of Pei's concern for his building material as an integral function.  

In choosing concrete for a structure, "The difference between crudeeness and virtuosity depends on subtle adjustments in mix, in timing, and in construction and condition of forms." "The City Hall project was the first, large-scale use for (shrinkage-compensating) architectural concrete in the United States." (It has been used more widely in Europe.) When concrete poured (cast) into a mold or an assembled form, as the concrete sets, it shrinks, causing unpredictable joining of surfaces and or cracking on the finished surface. "Shrinkage-compensating" cements have a chemical additive which causes a slight expansion in the concrete during the first few days of setting, to compensate for the inevitable shrinkage later. Pei's firm worked with the engineers, Terry-Rosenlund & Company, Dallas; for two years developing and testing this material with Texas Testing Laboratories, Dallas. Additionally, they arrived at a new buff-colored cement working with Texas Industries, Inc., Dallas, a cement producer. They were able to refine new techniques, while the City of Dallas was battling through delays in bidding rounds and contracts, for the new City Hall building.
Just as the 56 in. molded fiberglass form was specified in order to achieve a dense, uniform and smooth finish for the coffered concrete ceilings, for the exterior and exposed interior walls of City Hall wood forms were specified to cast the concrete into, in order to achieve the same kind of smooth, uniform finish. Since the quality of the concrete's finish is dependent upon the quality of the wood (the easiest material with which to construct forms), an imported Finish fir wood was used in 3/4 in.-14 ply laminate. This material was regularly used by the contractor for its durability, but it had never before been specified to them for a resultant exposed concrete surface finish.

Dallas City Hall's modular make-up and concrete surfaces are reminiscent of Kahn's Yale Art Gallery, whose vast expanse of ceiling was a paved concrete, exposed tetrahedral frame. In the same manner of material employed by Pei, the concrete surface of the Yale Art Gallery was left unfinished. Both structures enclose yet define impacting space for the viewer.

Another consideration of Pei's was that the wall surfaces, inside and out, appear undivided. Pei ruled out reveals (successive seams from pour lines of concrete), "since any pattern of reveals would, it was thought, look like an assembly of panels, rather than a monolithic wall."

So, a new technique was developed using a neoprene gasket recessed into the form, both of which must be precisely aligned, to prevent cement leakage and flaws in the surface (also used at the National Gallery). The added advantage of their shrinkage-compensating cement was an ability to proceed with larger pours than Pei's office had been permitted before - up to 70 ft. long X 14 ft. wide. The gasket allowed for smooth transitions of the
form between pours, instead of "breaking and jumping" the form, as in standard methods.\textsuperscript{36} (Fig. 3.14) Despite the technology and precision used in achieving this desired surface, the behavior of cement is erratic, so that in placing forms for each pour, an off-set adjustment at the base of the form (to allow for the expansion and shrinkage of the cement) was arrived at "empirically".\textsuperscript{37}

Concrete is the closest answer to an architect's dream, because of the great freedom it permits architects and engineers to pursue design ideas and achieve building forms not possible with other materials. ...freedom of form often results in a considerable challenge to the structural engineer - he has to make the architects' idea work.\textsuperscript{38}

In this City Hall structure, the choice of concrete was essential to the shape, form and symbol to be achieved by the structure. The new techniques developed and employed were also essential in seeing the design carried out as it was first conceived.\textsuperscript{39}

Pei's design was not a new shape for city halls. Two earlier examples of four-directional and two-directional outward sloping forms can be found in the Tempe, Arizona and West Covina, California municipal structures. But the Dallas City Hall's facade is the most steeply cantilevered front executed on a grand scale to date. The three massive vertical stair towers that visually punctuate this facade are reminiscent of Le Courbuser's entrance pylons for the High Court Building at Chandigarh, India. Although the shape of Pei's design is not new, it is the refinement of techniques and materials explored by the firm since the 1950's, that sets this concrete cast-in-place structure apart. This pace-setting structure not only has great strength, style, and originality, but demonstrates the level
of quality and precision that can be achieved with unusually demanding standards and specifications that were met in order to achieve the elegance of contour and surface.

Pei believes that:

While the modular construction perhaps only implies an organizational quality or orderliness, it is the human quality that is the most important aspect of a building. This is a city's public building for its community. As you go in the City Hall, the most important space is given to the people. This is where human activity takes place - a place to pay your tax bill.

From the public park plaza, one enters a three-story high lobby, and is directed by escalator to a sloped 100 foot high central court (Fig. 3.15). Three sides of this great hall are ringed by four floors of side balconies, three levels of which step back from the space in a reverse echo of the great cantilevered facade. The fourth side is glazed flush with the structural frame. Quarter barrels in the ceiling, (like Kahn's in the Kimbell Museum in Fort Worth) allow natural light, and open corridors to the balconies allow human traffic to vitalize and share the great open space. Adjacent to this space, the rectangular council chamber is also a high ceilings, accomodating the city's seal overhead and two 19 foot square projection screens. Facing the horseshoe-shaped council desk below are 250 seats set on a floor sharply graded towards it. Pei sees the council chamber as the heart of the building, where the city's business takes place. But as a space, he is much more intrigued by the play of light and shadow (Breuer's influence) into the great space of the building's center. Frank Lloyd Wright's Larkin Building and Johnson Wax Headquarters share this element of design. As Kahn stated, "Architecture
is a thoughtful making of spaces." Pei, in kind, states, "More and more buildings will be judged by their space instead of their form."

The Dallas City Hall gives the city an image of progress and confidence in the future. As the original 1873 courthouse, "Old Red," symbolized that the civilizing aspects of law and order had come to the prairie, so does this structure give order to the chaos of architectural styles it looks out at. This structure did not reflect the existing architectural fabric of Dallas but when it was dedicated in 1978, it became the architectural fabric of the city.

Both as architecture and as formal urban design the City Hall and Park Plaza are unrepresentative of the city that exists. Rather than epitomizing prevailing developmental attitudes and practices, the new center of government represents the way Dallas has always liked to see itself, namely as progressive, sophisticated, cultured, and perhaps paradoxically, as both future-orientated and tastefully conservative. This Dallas mystique, nurtured far more through economic expansion than environmental design, has finally been given some credibility in urbanistic form. In less capable hands that looming shape could look like Buck Rogers posturing, but in this case the effect is one of drama rather than mere theatrics.

"When we got into public buildings, a new kind of concern entered into our work, and that is the symbolic one," Pei continues. "Take the Kennedy Library. It's a small building. Yet the building cannot give the appearance of being small because it represents not just Kennedy himself, but the importance of the Presidency during the years when Kennedy was President."

Robert A. M. Stern finds the structure "gravitationally unnerving. "He states that even though the great space is dramatic, the building is lacking in "symbolic dimension." It does not have any of the classical
symbolism that ties public buildings together. Responding to critics who say that by removing scale elements some of his buildings tend to overwhelm visitors, Pei says, "because scale perception is very subjective, public buildings need to have a scale that is appropriate to its importance to society." For all its overwhelming drama, it would be a mistake to think of the city hall as primarily an essay in architectural form. Coupled with its park, its main significance is urbanistic, both as a component of a problematic downtown and as an icon for the entire city. The 11-year process of planning and construction was clouded by controversy and hesitation, but that effort has been justified by the results. In the architectural context of downtown Dallas, The City Hall is a Neiman-Marcus in the middle of bargain basement operators. During the postwar boom that nearly tripled the city's population, good design has been painfully scarce in downtown's plentiful construction. The City Hall, and to a slightly lesser extent the new Reunion Tower, have already made 1978 the best year for downtown Dallas architecture in a generation.

Pei has said that a city, "so far from being a cluster of buildings, is actually a sequence of spaces enclosed and defined by buildings. This thought may be strange but is the essence of urban design." Pei believes that a city should only have a limited number of buildings of strong, assertive character.

The structure has its problems—typical ones for a building of that size: hot spots in the summer, cool ones in the winter, irreplacable down light fixtures, as well as electric lights impossible to change when a bulb burns out. Designed initially to house 1400 people, 2200 now use its spaces and fill its parking garage. Except for the mayor's domain and those of some of the department heads, there are no private offices in the entire building; over the years a colorful modular type of furniture has been introduced to combat the unadorned white walls and concrete structural
elements; an interiors review committee decides on acceptable office decoration and their decision is final. 50

Unfortunately, the construction of the Dallas City Hall has not yet caused the transformation of the surrounding area that Pei had predicted. A "dialogue" began when Pei placed his city hall next to the largest building in the CBD, the Dallas Convention Center. Together, the two buildings act as a solid city wall as one enters downtown from the south. Together, they are very formidable structures. The Dallas Public Library, built directly north across the park plaza, was designed to echo in reverse the shape of the City Hall. It is a stepped pyramidal form and complements the enclosed space as defined by the buildings. Other buildings of equal height that surround the park plaza, have been remodeled (Employers Insurance Company) and repainted (501 S. Ervay) so that they might also take place in the "dialogue". However, the success that Pei enjoyed in designing the Civic Center in Boston has not yet happened in Dallas. Pei is still confident that other interesting structures and spaces will eventually surround his ten acre site and complete the essence of urban design that he has envisioned. Pei reflects:

The people of Dallas have influenced me to build a strong building. They have great — what should I say — pride in their city. We don't openly express that pride in New York or Boston. It is a new city. The people are making the city. It has to look like a city hall and has to speak for all of the people.

Charles Jenck's critiques the building:

Dallas City Hall speaks the language of late modern architecture. It derives its form from such late modern masterpieces as Le Corbusier's Notre Dame de Ronchamp and Saarinen's Dulles Airport. Contemporary with his East Wing of the National Gallery, it is a more creative use of a structural shape. His use of reinforced concrete treats the material with a hard, flat, precise surface,
more like steel than masonry. He combines extravagant features with this extraordinary shape: smooth glass walls, strong verticals smashing through the cantilever to set up a basic antithesis to the horizontals and bands of diagonals alternate with indented blocks. Pei uses this hard-edged form as hyperbole.
Fig. 3.1 Dallas City Hall
Fig. 3.2 Cantilever View
Fig. 3.3 Ends of Building
Fig. 3.6 Tensioning

Fig. 3.7 Fiberglass Squares

Fig. 3.8 Floor Slab Modules From Above
Fig. 3.9 How Floor Increases
Fig. 3.10 Crane

Fig. 3.11 Coffered Ceiling
Fig. 3.12 Module Cutaway  

Fig. 3.13 Curbs to form Troughs
Fig. 3.15 Interior Great Hall

Fig. 3.14 Neoprene Gasket
NOTES


2 R.S. Fling, "A New Slant on Quality," Concrete Forming 3.

3 Dallas City Council, "Goals for Dallas, the Design of the City," I. M. Pei & Partners Office File, Dallas, Texas.

4 Ibid.


8 Transcript of Interview with I. M. Pei, TV Station KERA, Dallas, Texas, 1972, p. 6.

9 Ibid., p. 2.

10 Fling, "A New Slant On Quality."

11 Transcript of Interview With I. M. Pei, TV Station KERA, p. 3.

12 Ibid.

13 Dean, "Conversations with I. M. Pei," p. 61.

14 Ibid., p. 65.

15 Fling, " A New Slant on Quality."


17 Fling, " A New Slant on Quality."


19 I. M. Pei Telephone Interview.

21 Ibid., p. 15.

22 Ibid.

23 I. M. Pei Telephone Interview.

24 Fling, "A New Slant on Quality."

25 Ibid.


27 Ted Amberg, "Designing in Concrete," *Concrete Forming* 3.


29 Ibid.

30 Ibid., p. 90.

31 Ibid., p. 92.

32 Ibid.

33 Ibid., p. 93.


36 Ibid., p. 91.

37 Ibid.

38 Ted Amberg, "Designing in Concrete."


40 I. M. Pei Telephone Interview.


43 I. M. Pei Telephone Interview.


46 Stern, Pride of Place, p. 220.

47 Dean, "Conversations: I. M. Pei," p. 61.


50 Telephone interview with Central Building Management Office, Dallas, Texas, July 7, 1986.

51 I. M. Pei Telephone Interview.

CHAPTER IV

THE MORTON H. MEYERSON SYMPHONY CENTER

Due to the northward direction of growth Dallas had taken, a study entitled, "A Comprehensive Arts Facilities Plan for Dallas," by Carr-Lynch Associates (consultants hired by the city), recommended, in 1976, that the nine major arts organizations of the city should be relocated in the Central Business District the idea for the Arts District was thus created. With Dallas continuing to focus on itself as a city of the future, the Arts District was developed as an all-encompassing, cultural, entertainment, commercial and residential area located in the northeast quadrant of the CBD. The area was conceived to better serve the growing Dallas population, and is seen as a remedy to the now inconveniently located and antiquated Fair Park District situated southeast of the CBD, where Dallas' cultural activities have been centered since the Centennial of 1936.

In keeping with the Dallas desire to be "BIG," the new Arts District will cover sixty acres, cost $2.6 billion and take fifteen years to complete (See Fig. 4.1). Anchored at the west end of this district is the Dallas Museum of Art (DMA), which opened in 1984. It is a low, sprawling, limestone structure designed by Edward Larabee Barnes, who combined traditional Beaux-Arts elements (such as a barrel vault and enclosed gardens) with a hard-edged detailing of mainstream Modernism. The structure is formal, yet humane and inviting.¹

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Its main ceremonial entrance at one end of the barrel vault faces east and commands a view of the entire Arts District as it looks down Flora Street. This six block-long tiny ribbon of a street is being transformed into a tree lined thoroughfare that will act as the spine for the twenty square block area that will contain Dallas' cultural institutions. The latest institution to make its address on the grand avenue is the new home of the Dallas Symphony Orchestra (DSO), the Morton H. Meyerson Symphony Center, designed by I. M. Pei.

The history of the inception of the new Symphony Hall is a long and problematic one. A permanent home for the Dallas Symphony Orchestra has been dreamed of and discussed for many years. The Orchestra's present rented base, the Music Hall at Fair Park, is an excellent facility in many respects, but it is too large (3,400 seats) to be acoustically ideal for the Orchestra. Also, the great number of many varied events scheduled there limits the Orchestra's annual performing residency to twenty-two weeks, and even that time is divided by a three-month hiatus from October through December. The excessive size and the lack of availability of the Music Hall unquestionably have inhibited the Orchestra's public attendance and programming, thus restricting the Symphony's artistic progress.2

Hopes were temporarily dashed for this area in June of 1978 when a $45 million bond issue was soundly defeated during the generally negative climate for public spending brought about by the passing of "Proposition 13" in California. However, the Arts District's proponents did not stay down for long. By November of the following year, led by the members of the DMA, they won a $54.6 million bond issue for three downtown arts projects. This included a provision for $2.25 million to acquire land for
a new Concert Hall. The Symphony Association then went to work forming its Concert Hall Committee. This committee set the strategy for winning the 1982 bond issue for $28.6 million in construction funds for the Morton H. Meyerson Symphony Center.  

The committee also charged themselves with the selection of an architect for the project. Stanley Marcus, as a committee member and friend of I. M. Pei, convinced him to make a pitch for the job. The committee was especially pleased by Pei's pledge to design and to oversee the total project himself. "Some of the big-name architects will do the concept work on a project and then you won't see them again until ribbon-day." Pei also impressed the committee with his commitment to devote his own time to the job. As he had told them, "I have never designed a concert hall, but before I die, I want to build a great one." Other reasons for favoring Pei were his knowledge of the city, having just recently finished the City Hall, and his daring design for the East Wing of Washington's National Gallery of Art, which had astonished the art world. That talent for capturing the public's imagination would be essential to the economic success of the hall itself, to the viability of the new District as an urban project, and to the city as an additional new dimension to its architectural fabric.

Early in their deliberation, members of the Dallas Symphony Association's Concert Hall Committee assigned a high priority to the acoustics of the new structure. Studying the work of leading Concert Hall acousticians, they prepared a brief that outlined acoustical goals for the proposed hall. Traveling at their own expense, these members visited twenty-one halls in North America and Europe. From this series of study
tours emerged a detailed document of requirements for the Dallas project. The influence of shape on musical acoustics of a room is one of the most important questions facing the designers of concert halls, opera houses and other spaces for the performance of music.6

Consequently, the acoustics brief of the Concert Hall committee required the acoustician to achieve, as closely as possible, the acoustical properties of the Musikvereinsaal in Vienna and the Concertgebouw in Amsterdam. It specified:

The completed hall must have the following qualities:
1. Excellent base response which provides a rich and full foundation sound for the orchestra.
2. A good blend and mixture of sound without excessive loss of clarity.
3. Brilliance in the high frequencies and good clarity of the various orchestra lines in combination.

The committee also gave high priority to achieving the following objectives in combination with the acoustical environment:
1. A sense of intimacy between the audience and the orchestra (both a visual and an aural intimacy).
2. Excellent sight lines for the audience.
3. A comfortable environment for experiencing music.
4. An overall visual environment for the room which complements the source and creates a sense of physical pleasure and well-being.
5. Stage acoustics which allow the musicians to hear each other well and to play without forcing.

The committee selected Russell Johnson of Artec Consultants, New York City, to plan the acoustical design of the hall. The committee noted that critical listeners have often observed that rectangular (shoebox) rooms have "better" acoustics for music than fan shaped rooms of similar size. Acoustically the concert halls generally accepted as the world's greatest are the Musik Vereinssaal in Vienna, the Concertgebouw in Amsterdam (the two cited by the committee), Tonhallesaal in Zurich, Symphony Hall in Boston, and Carnegie Hall in New York City. They are all rectangular in
plan and section, and seat a limited audience of not more than 2,000 by present day seating standards. Russell Johnson confirmed that in light of recently acquired knowledge in the field of room acoustics, through computer analysis, the reason for the acoustical success of these highly praised older halls is a close relationship between room shape and size. For instance, in the rectangular room, one can observe that the sound reaching the listener arrives from many different directions. Musical instruments radiate their sound in very complex patterns; the violin radiates high frequency sound, including bowing noise, in a strongly upward direction, while the instrument's mid-frequency sound radiates predominantly sideways and low frequency sound in all directions. The precise details of the instrument's radiation characteristics are exceedingly complex and vary from note to note and instrument to instrument. For the listener to hear the full timbre of an instrument, the sound radiated in many directions by the instrument must be reflected to the listener. One can observe that the number of sound rays arriving at the listener is affected by room shape. The greater the number of arriving rays and the more spatially even their emanation from the sound source, the greater the efficiency of the room in its task of providing the listener with the full timbre of musical instruments. A substantially greater number of rays arrive at the listener's position in a rectangular room than in the widest fan shaped room. One can thus expect to hear a more complete, full timbre in the rectangular room than in the fan-shaped one.

Summarily, and of utmost importance, the committee dictated the necessity for the architect and the acoustician to agree to collaborate in the design of the space that would enclose the music and its listeners. Pei would collaborate with this sound expert to design a hall with world-class acoustics. "Historically, the relationship between architects and acousticians has been a bloody one, and we were very concerned that we would not be the battlefield on which that fight would be fought," Marcus recalls.
Pei reports a good rapport between himself and Johnson, and while assigning acoustics first importance in the hall's design, Pei adds that the design is "a very subtle mixing of acoustics and ambiance. A good hall has to sound well, number one, but it also has to feel well." He is a devotee of classical music. "Mozart, Beethoven and Bach are my favorites. I am very old-fashioned. Not at all imaginative." He also has visited many of the world's great concert halls and has studied the site of Dallas' proposed hall at Flora and Crockett Streets just inside Woodall Rodgers Freeway. He echoed the symphony committee's own thoughts: "Many concert halls are unspeakably boring, and the Dallas site should be more than a box where a few people hear old music." Simply stated, the purpose of the hall is to enhance the sound of the orchestra, to bar the noise of traffic, jackhammers and Love Field jets, and to draw the interest of the community as a whole. It is proven that the form best suited to the acoustical criteria is a huge shoe box. Pei thought that might be "cold. Boring. Intimidating." He pondered, "How to tame the box. That's a major problem in every concert hall. You need the box to insulate the sound, but then you need to find a way to diminish its visual impact."  

A Beaux-Arts architect with his love of ornamentation would have turned the box into a Greek temple--put columns around it and pediments on top. Pei's teacher, Walter Gropius, and his strongest influence, Mies van der Rohe, both adherent die-hards to the glass and steel modernist beliefs, might have built a giant unadorned shoebox (form follows function). Pei, a second generation modernist, who never totally agreed, but never rejected the credo either, could do neither. "I don't want to wrap a blank box around a blank box; that doesn't make sense." Great architecture has to
serve a buildings function and express its spirit. Anything less is mere craftsmanship or "space planning." Europe's great cathedrals are among Pei's most beloved buildings because they are an embodiment of the times (strength from religious convictions). The concert hall would have to capture a public spirit that would be open, inviting, and thrilling. "If I want to convince non-music lovers to love music, the first step has got to be getting them intrigued about coming in."18

In 1979, when visiting the initial site in the city's emerging Arts District, he knew that he had a few problems. The new Dallas Museum of Art was being built at the west end of the district, facing east. His concert hall would be in the center of the district, a full two blocks from the museum (Fig. 4.1). It should have some sort of architectural dialogue with the museum. It also should take note of the fact that it was merely five blocks from the center of downtown. But because its site was so small--an acre or so--the hall as he envisioned it could barely be squeezed onto the property. Worse, it could only face south, toward downtown, and preclude any dialogue with the museum to the west. He would need almost twice as much land as the symphony owned if he were to do the job right. Pei asked for more land (this approach worked at the Dallas City Hall a decade before) and he got it. The Borden Company, at Mayor Jack Evans' request, donated the extra land. Now his Symphony Hall had a panoramic view of the skyline to the south and the Arts District to the west.

Pei began brainstorming: "Architecture is form, space, light and movement. Movement is the one element that isn't getting enough attention. All those knife edges and elegant surfaces in the East Wing don't excite me although the public seems to like them. What intrigues me is how people
experience the interior spaces, how they move through them." In the same breath, he acknowledges a profound debt to the Pompidou Center in Paris, not for its high tech design, but for its transparency and look of continuous animation.¹⁹

Pei's Harvard training had taught him to despise the Baroque. Now he loves it:

I can recall visiting baroque churches in Germany that had undulating walls. The surfaces were lyrical and sensual but the most intriguing thing was that they provided an infinite number of vanishing points. Why we have forgotten the Baroque is beyond me. We experimented with perspective in the National Gallery, but we were using triangles and all the action was on the inside of the building. In the concert hall, I'm trying to bring all that to the surface.²⁰

The question for Pei was how to bring back this Baroque richness of space within the idiom of modern architecture. Because of its triangular, modular form, Pei considered the East Wing to be a three-point perspective building.²¹ For his concert hall, he needed a form that had an infinite number of vanishing points.

His design solution was to set the rectangle at an angle within a transparent circle, within a larger rectangle— all placed on a site that is almost square (Fig. 4.2). As has been noted, this complexity of design grew out of not only the function of the building, the demands of the site, the nature of the acoustical hall itself, but also Pei's need to incorporate previous architectural lessons learned, with his desire to expand his concepts of architectural history. The tall central box that houses the concert hall proper (to describe the project inside out) is angled in relationship to the rest of the building to orient it to the Dallas skyline, which occupies a different street-grid system from that of
the concert hall site (Fig. 4.3). Through the transparent circle, this central structure also presents its longest silhouette to the Dallas Museum of Art thus establishing a relationship between these two buildings that will be important to the Arts District. The larger enclosing rectangle, on the other hand, is oriented to the streets surrounding the site. The Flora Street side is entirely glassed and encloses the building's main entrance. Pei has extended this side with a kind of false front so the facade appears roughly symmetrical when viewed from Crockett Street. At the southwest corner of the structure, where the inner and outer rectangles come together, Pei has opened the hall with a curved glass wall that billows out into the adjoining plaza. Lens-shaped skylights pierce the roof on three sides of this continuing curve. This encircling glass wall creates an arresting contrast to the blank concrete mass of the concert hall itself. With the skylights atop three sides of the glass curtain, the "public face" of the building, then will be wide open to all pedestrian and motorist traffic in the Arts District. The three faces will look out on both the Art Museum to the west from a restaurant located above the lobby and towards downtown to the south and east so that it will form a continuous dialogue with its surroundings. 22

This dialogue continues as one enters the interior of the Concert Hall itself. The exterior materials of limestone and concrete (now fibers of the basic fabric of Dallas apparent in its public buildings—the Dallas City Hall and the Dallas Museum of Art) are drawn into the interior defining and enhancing the divisional sections of the room. The main floor, which will contain about half the 2,200 seats, will be split by two aisles running the length of the hall (Fig. 4.4). At the sides and back of the
main floor will be a semi-balcony, raised slightly above the floor. Above this will be three true balconies, each with long, narrow arms extending down the sides to the stage—a feature the hall will share with Symphony Hall in Boston. The ceiling is high, but the acoustical and visual scale are variable by means of a mechanically adjustable large wooden reflector canopy suspended over the front half of the room. A massive reverberance chamber runs along the perimeter of the ceiling. Sound absorbing curtains can be extended over much of the wall surface to tailor the acoustical environment to the performance. Natural light will softly illuminate the chamber through transparent panels at the rear of the hall.\(^2\)

At the front of the hall, the Orchestra will sit on a large riser unit on stage (Fig. 4.5). Johnson says the whole orchestra will be visible to everyone on the lower floor. For non-musical events, the stage can be lowered about 20 feet, the riser unit rolled off into storage, and the stage raised again for use as a flat surface. Around the back of the stage will be a narrow semicircle of about 250 seats that can be used for a chorus or may contain listeners during non-musical performances. A continuous plinth of wood grows upward around the lower level of the audience. Brass railings accent the seating levels. The focus of the concert room, behind the performance platform, will be an organ, stunning in its geometric design, and its case designed for performance with the orchestra, as a concerto instrument and as a recital instrument.\(^2\)

As the interior of the Dallas Concert Hall reflects the qualities of the great concert halls of the Nineteenth century and the monumental scale of the building in its entirety, Pei draws from other aspects of the same
period, like the grand staircase of the Paris Opera House (Fig. 4.2). Reminiscent of those other halls, Dallas' hall will take the visitor through a succession of spaces marked by clear transitions. "An important pleasure is arriving. That sense of being on stage, being watched." Pei decided early on that the entrance would have to be exciting and dramatic. The visitor will move as in a grand public promenade from the formal symmetry of the Flora Street entrance and ascend the grand staircase to a semicircular reception area on the main floor. Those on their way to one of the balconies will continue up one of the paired staircases to their seats. The movement is from symmetry to relaxed informality and back to symmetry.

Pei envisions the street level for everyone, whether they have a ticket or not. It was Pei who convinced a reluctant DSO to incorporate a restaurant, shop and music gallery into its new building. "It should be designed as an educational instrument," Pei says of his hall. "There should be tours for students, and a place where children can learn all about musical instruments." "I want that space to be full of life," Pei says. "Animated with movement of people. When you see people, you are attracted." In the daytime, the glass will bring light into the hall; at night, people "feeling the glow from the hall" should say: "'Gee, I want to go there. That looks exciting.'" "What good are all of these cultural institutions if they don't serve the widest possible audience? We don't need more elitist places. The public will flock to museums and concert halls if they see excitement." Pei also hopes to hang enormous banners and flags in the large open "window" that forms part of the Flora Street side of the building. The opening both defines the space and lets
us see that there is something else beyond. "I got the idea in Paris. Two or three times a year a flag is suspended from the Arc de Triomphe. You can't see the wires that hold the flag—it just seems to be floating and turning in thin air. It's very exciting and should add a sense of festivity to the hall."\(^{30}\)

But, the most exciting aspect of the building, to Pei, is the technical step of making the walls and skylights together seem like a spherical enclosure. One point perspective is very powerful in its ability to draw one in and direct one's attention to a single focal point, as in the great cathedrals or the Forbidden City. Most buildings, however, are constructed on grids with two parallel sets of lines. The Greek temple was designed to be approached diagonally. It offered the viewer two sides at once, each extending to a distant vanishing point: two point perspective. A triangle (such as the East Wing of the National Gallery) has three. Those who have visited the Museum have experienced "the sense of almost limitless space that comes after the passage through the concourse into the building's great atrium. The more vanishing points you have, the more lively the space is... especially as you get out and move around in it." A sphere would have an infinite number of vanishing points. "When you have that three-dimensional curvature, theoretically—I have not been able to prove it yet—the internal space is going to be very exciting, even if you don't use a lot of color or those other things you normally use to decorate."\(^{31}\) Pei restates his basic philosophy: "It's the space and the mysteries of form that are timeless. I never learned the importance of space in school—how to make space exciting. It's something self-taught. If an architect doesn't develop a fondness for space, he's not an
architect." It is also the play of interior spaces, the pull and push of lines and curves and the drama of movement that intrigues Pei the most. "I can imagine only 60 percent of the space in this building the rest of the space will be as surprising to me as it is to everyone else. That's what makes the project so exciting. I can't wait until its finished so I can walk through it."33

One of the greatest examples of a building with multi-vanishing points is the Hagia Sophia. It is the first example of its kind because of its spherical form. It has a series of spheres and hemispheres and quarterspheres. Pei credits the space that this structure creates (along with those in Baroque churches) as the major influence on him in his creation of the Symphony Center.34

Pei also acknowledges the knife-sharp edges and dramatic angles that distinguish his Dallas City Hall and the East Wing of the National Gallery as previous projects that have influenced his thinking about the Hall's design. His angles have, however, now given way to softer curvilinear forms—notably the three glass "lenses" that surround the hall and admit natural light to the interior of the building. The concert halls' intricate human circulation system shows his deepening interest in surprising vistas and dissolving perspectives.35 He credits no other sources for the Symphony Hall, but states that any architect working today owes an indebtedness to great architectural achievements of the past.36 While the building resembles nothing else among his fifty--odd major projects, it is in a sense, vintage I. M. Pei. At the unveiling of the Concert Hall model a reporter remarked that the new concert hall did not
look like a Pei building. Pei dismissed this as a "layman's remark," preferring to describe the design as evolutionary. Pei's design for the Dallas Symphony Orchestra's new concert hall blurs the distinctions between his elegant, classical foundations and his geometrical, detailed style of modernism while evoking his reverence to the history of architectural styles. The resulting creation is a new species of Pei, a link in his maturational development. This is a part of the metamorphosis that I. M. Pei believes every architect must undergo.
Fig. 4.2 Dallas Symphony Hall
Fig. 4.4 Interior Concert Hall
Fig. 4.5 Stage
NOTES

1 Dillon, Architecture 1936-1986, p. 130.

2 Dallas Chamber of Commerce Fact Sheet, Morton H. Meyerson Symphony Center.


4 Ibid.

5 Ibid.

6 Dallas Chamber of Commerce Fact Sheet, Morton H. Meyerson Symphony Hall.


9 Ibid.


13 Ibid.

14 Ibid., p. 51.

15 Ibid.

16 Ibid.

17 Ibid.

18 Ibid., p. 52.


21 I. M. Pei Telephone Interview.


24 Ibid.


26 "I. M. Pei: Carving Art Out of Space," sec. c, p. 1.


28 Ibid.


30 Ibid.


32 Ibid.


34 I. M. Pei Telephone Interview.

35 Ibid.

36 Ibid.

As one moves out of the realm of civic buildings (public), designed by the firm of I. M. Pei & Partners, and into the realm of corporate and speculative development structures (private), a shift towards a more rigidly pure geometric style can be seen. Primarily, this change can be attributed to the influence of Henry (Harry) N. Cobb, who is responsible for the design of three private buildings in the Dallas CBD: One Dallas Centre, a speculative office building; Allied Bank Tower at Fountain Place, a mixed-use speculative development center; and the ARCO Tower, a corporate headquarters.

Harry Cobb was born in 1926, in Boston, Massachusetts. He was educated at Philips Exeter Academy (Diploma 1943), Harvard College (A.B. 1946), and the Harvard Graduate School of Design (M.Arch. 1949). As one of the three founding principals of I. M. Pei & Partners, Harry Cobb has contributed actively and continuously to the work of the firm since its formation in 1955. Throughout his career Mr. Cobb has coupled his professional activity with teaching. He has lectured widely, and has held the Davenport and Bishop visiting professorships at Yale University.
From 1980 to 1985, he served as Studio Professor and Chairman of the Department of Architecture at the Harvard Graduate School of Design, where he continues to hold an appointment as Adjunct Professor of Architecture. He is a Fellow of the American Institute of Architects.

The history of the parallel track of stylistic development that both Harry Cobb and I. M. Pei have followed can be plotted from the beginning of their association at Harvard's Graduate School of Design in 1946. While Cobb was completing his Master's degree, Pei was a young member of the faculty. Although Gropius was the magnet who drew them both to Harvard, both Pei and Cobb were more deeply influenced by Mies van der Rohe and fell directly under the influence of the Miesian ethic. Cobb explains:

I use the word ethic rather than aesthetic, because Mies' belief-system had, or at least we interpret it as having a very significant moral dimension. This was both its strength and its limitation. Within this belief-system, there was a right way and a wrong way of making things; and that notion of right and wrong permeated the entire enterprise of architecture from its broadest conception at the scale of urban planning, to its ultimate materialization in the smallest detail. Miesian notions of order clearly constituted the essential of design strategy for dealing with tough real world problems.

Cobb says that this Miesian common ground was the basis of a relationship that has endured to the present. However, he can now reflect that at that time and their young age, it was a naive enthusiasm. But it was their enthusiasm that formed a nucleus of a philosophy, which when combined with their ambitions and Zeckendorf's method and money proved their Miesian philosophy to be a valid belief-system. While still unaware of their own naivety, and with the pure audacity of their convictions, they saw these beliefs realized in the large-scale development projects initiated through Zeckendorf. Before he was thirty, and just six years out of school, Cobb
became the principle architect of the Place Ville Marie (PVM) (Fig. 2.2), the mixed-use development that re-animated downtown Montreal. Cobb remembers this seven year project, along with the planning and building of the John Hancock Tower in Boston (Fig. 2.8), as two of the more important projects in his career. Both did change a part of an urban district, thus directing the course of an urban fabric. Yet he distinguishes one from the other, by virtue of the fact that the Hancock Tower was...

... an institutional project built for owner occupancy rather than a real-estate investment project built for diverse tenancy. The spirit of the enterprise is therefore, very different. It is another project that seems to have occupied about seven years of my life. Unlike the Place Ville Marie, it is a highly distilled work in that it crystallizes the predicament of the big institution as a citizen in its community. The Hancock Tower is significant not because it solves a problem, but because it illustrates a problem... and so it became a focal point in the urban fabric.

Cobb is still wrestling with these two controversies: can the architect reshape the urban space, as Cobb successfully did in the 1960's with the PVM in Montreal; and can the architect successfully weave an individual building into the fabric of a city, as he did in the 1970's with the Hancock Tower in Boston? Now in the 1980's, Cobb again is reworking both problems in Dallas with the addition of three of his buildings to the Dallas skyline. One Dallas Centre (1979) and the Allied Bank Tower at Fountain Place (1986), both of which are speculative (that is built with no particular client in mind) buildings, continue to question the validity of the economics and the design of mixed-use development in the urban re-shaping of the city center; ARCO Tower (1983), questions its relationship as an individual corporate structure in the developing architectural fabric of Dallas. Since these buildings share similar
design traits and all were designed within a seven year period, not only can they be looked at as a group, but also on an individual basis to see the mechanical and structural differences.

ONE DALLAS CENTRE

One Dallas Centre, completed in 1979, is a 30-story speculative office building with a diamond shaped plan that rises 375 ft., like the prow of a great ship (Fig. 5.1). Two triangular notches are incised vertically from the top to the bottom floor on two parallel sides, a feature that adds not only architectural interest to the exterior, but also makes economic sense (four more corner offices per floor that demand a higher lease rate) (Fig. 5.2). The diamond shape of the building has been directly dictated by its site. Says Cobb:

We try to take a distinctive characteristic of each place as a beginning point. Thus, the special character of One Dallas Centre is related to the site rather than (being) arbitrary. Its placement is a direct result of existing conditions here that are not typical of those in other cities.5

This means that Grisby's tract of land meets Bryan's 640 acres at the site: the orderly grid of east Dallas (Live Oak and Bryan Streets) meets that of north Dallas (St. Paul and Harwood Streets) at a 30 degree angle. The shape of One Dallas Centre synthesizes this meeting of grid patterns.6 "Unlike its neighbors all struggling to keep their faces straight, One Dallas Centre repeats the angles around it and becomes a prism, its diamond shape lightened and enlivened by that triangular recess (notch) into two of its sides."7
Cobb believes that American cities have become filled with rectangular boxes, like objects in which the spaces between tend to be leftovers. The deliberate use of a diamond-shaped building illustrates the concept that a high-rise does not have to be a rectangle. "If you plunk a lot of box-shaped buildings next to each other you 'homogenize' a city and the buildings also become competitive and tend to cancel each other's identity. It's also important not to lose the opportunity to create outdoor spaces in a city like Dallas."  

Cobb creates a new geometry that is rich, yet subtle architecturally, by carefully calculating the building to complement the space between Republic National Bank's and Southland Life's rectangular-shaped towers. One Dallas Centre, as a small diamond-shaped office structure, stands directly between these two rectangles, but is angled to look past, rather than stare at the face of its neighbors. Thus, it is compatible with, but not competitive with the multi-structure complexes surrounding it. The building in no way associates itself with those of the Southland Center, and must certainly react neutrally to the brightly colored exterior (tourquoise-blue) of that complex. If any association is inferred to its neighbors, it is with the Republic Bank Tower complex and its reserved steel-grey molded aluminum exterior panels. One Dallas Centre proves that contemporary materials can implement contemporary design in a fashion appropriate to the times.

Cobb was extremely conscious of the energy problem when planning this building. The office tower is sheathed in a continuous skin of reflective glass and aluminum that was especially treated with a grey coating as an energy-saving device. Although windows compromise a third of the building, one experiences them as great horizontal expanses, rather than confined elements, because the building was kept free from mullions.
The building's exterior is designed by alternating rows of glass with aluminum panels. Although the glass is reflective, it is only 20 percent so, because of the energy-saving coating. The building's exterior would seem an opaque surface, were it not for the highlighted edging of two inch stainless steel bands which ribbon both top and bottom of the glass panels. The three elements to this exterior are precisely aligned to form a smooth vertical plane. Each row of glass is butt-jointed end to end around the building's perimeter, making the tower the first of its size to be completely mullion-less. Philip Johnson's Post Oak Center in Houston, Has similar horizontal alternating rows of glass with aluminum panels.

The structural system of One Dallas Centre is revealed at the two ground floor entrance areas, at diagonally opposite sides of the building (Fig. 5.3). The skin of the tower is broken only at the lobby level where Cobb permitted the exterior surface to fold back on itself, creating a recessed area that extends along the interior. This recessed wall not only provides a generous arcade on both sides of the building, but reveals the structural system of the building for twenty-nine floors above. It is only hinted at by joints in the aluminum spandrels. Gleaming stainless steel columns that create portals at the entrances to the building accentuate the sides.

The building's superintendent has pointed out some of its flaws: the odd-sized ceiling grid and tile require a costly special order and a six to eight month wait for replacement; there is no air-conditioning in the restrooms--only exhaust fans; and there is no loading dock--only a driveway; thus, freight must be unloaded, carried into the building, then transferred to a freight elevator. Both mechanical zones (fans) and
electrical zones (busducts and panels) are located in the same room, thus creating a potential hazard.11

ARCO TOWER

The Atlantic Richfield Company (ARCO) Tower is a gleaming corporate monolith, located at the "heart" of the CBD. Its 1.4 million square feet of space fill a prism-shaped, equilateral triangular structure, that is set three stories below grade, while piercing forty-nine stories into the Dallas skyline (Fig. 5.4). Stunning in its simplicity, the tower projects its taut skin through alternating horizontal bands of polished grey granite and moderately reflective glass panels with stainless steel trim. Located on the very site of the original ten story ARCO building in Dallas, the new tower is designed to both blend with, and enhance its site. This bold triangular tower meets the ground on a trapezoidal base, set askew on a 60,000 sq. foot rectangular city block bounded by Bryan, Ervay and Federal Streets along with the Burlington Mall (Fig. 5.5). The shape and placement of the structure on this site is meant to complement the adjacent Thanksgiving Square. Because the apex of the building faces this green urban oasis, Thanksgiving Square can be viewed from two sides of the tower. Around the structure's base, red and grey granite paves a triangular forecourt that connects the site visually to the square and to the five story post office across Ervay. It is generously dotted with mature live oak trees12 (Fig. 5.6).

As one enters the 26 foot lobby, one encounters the stark, sharp, geometric forms of the exterior repeated in their simplicity. Twenty-four elevators, divided into four banks and four escalators leading below grade
are the focal point of this marble-floored space. Neville Lewis and Associates designed the interior with employee comfort and convenience in mind. An angled partitioned scheme repeats the building's triangular shape while adding visual interest. Doors are indented and set at angles to the corridor's plane. An indirect lighting system features louvers that direct light and eliminate glare. Modular designed offices on every floor can be adapted to meet the company's changing needs.13

The modular unit is defined on the exterior of the structure by stainless steel vertical supports framing the horizontal windows (Fig. 5.7). Cobb's brilliant attention to geometric unity is apparent as one can view eight of these modular units on each of the exterior sides of the structure. The taut surface of the north facade of the building is broken by a Henry Cobb signature triangular notch, cutting an opening on 41 of the 49 floors. If seen from above, the building sports a right, an isosceles, and an equilateral triangle at the 49th, 43rd, and the 6th story levels. These breaks allow track mounted exterior service gondolas to reach the lower floors, as well as providing open areas for skylights that illuminate the executive offices and reception areas from above. Sophisticated electronics monitor the climate control system, as well as security and communications.14

ALLIED BANK TOWER

The prismatic design for the Allied Bank Tower, at Fountain Place, has made an instant landmark in Dallas15 (Fig. 5.8). As a most distinctive structure amidst Dallas' skyline, the reflective glass curtain wall and its
hard-edged angles form a variety of mirrored geometric planes and produces a jigsaw image on its surface of the surrounding downtown structures. "The prism effect is produced by topping a solid rhomboid with a skewed triangular prism and hugging right-triangle tetrahedrons against two sides. The tower that results has no typical floors, no roof, walls with a 2:1 slope and floor plans that vary from rhomboids to Z's."16 The rotation of these varied angles and planes around the shape of the building evokes a strong sense of movement, and that of a prism's multi-faceted shape. As the building's many planes rise sharply from its base, the light striking its glass face seems to pierce each surface and refract the rays. Despite the seemingly ever-changing, geometric shapes produced when the building is viewed from different angles, it is a precise example of pure, symmetrical geometry. When the companion tower is completed (a second identical structure, turned at a ninety degree angle), the complex will bring Philip Johnson's Penzoil Place of 1976, in Houston, to mind.

The Allied Bank Tower was developed on a 5.8 acre site at the northwest end of the CBD by the Criswell Development Company of Dallas in partnership with Campeau Corp. Texas (a subsidiary of a Canadian real-estate company). As one of the largest downtown sites, it is considered to be one of the most strategic locations within the spreading fabric of downtown. The site is located one block inside the border of the CBD, which is formed by the Woodall Rodgers Freeway. The site is bound by Field Street, Ross Avenue, Akard Street, and Munger Avenue. This places the site two blocks from, and between both the West End Historical District and the Dallas Museum of Art (which anchors the base of the designated Arts District)(Fig. 5.9).17 Criswell, who had bargained with Campeau for the
development rights, had built a solid reputation with successful suburban projects, but this would be their first downtown development. They were determined that their first building in the project would be top-rate, first-class, and distinctive; or "A-rated". In terms of a developer's economic projections for a rate of return on investment, buildings are classified as A, B, or C buildings, with an "A" building being the top of the scale. A rating is based upon a building's desirability of location, suitability of design to its functions, and its overall aesthetic appeal. The rating of these factors, determines a building's rating, and thus, sets leasing prices. These purely physical factors may deteriorate over a period of time and thus, so may a building's rating, affecting its ability to be profitable.

Criswell's & Campeau's location was suitable to a structure that could signal the gateway entrance to the CBD and that is exactly what they aspired to. After securing a tenant with a "name" (Allied Bank of Allied Bancshares) a device which has proven to draw more tenants, they approached the architects with a name in Dallas; I. M. Pei & Partners. They hired what they knew to be the nation's top architects and landscape designer.

The Allied Bank Tower at Fountain Place was designed through a collaborative effort between Harry Cobb, Harry Reese, (architect, Harry Reese and Associates, Chicago), and Dan Kiley, landscape architect, (Kiley-Walker, Charlotte, Vermont). Allied Bank Tower is the first phase of three in the planned mixed-use development of Fountain Place. Criswell Development Company hopes that this project, with its exciting and innovative ideas, will emerge to give Dallas not just a new building, but a new place.
The tower is 720 ft. high and 1.2 million sq. ft. in area. It rises fifty-seven floors above grade and extends three floors below grade to accommodate three levels of parking. At ground level, the vast volume gives way to space. Opposite corners of the towers are cut away creating 54 ft. by 156 ft. soaring lobby openings on two opposite sides, and 54 ft. by 90 ft. openings on the remaining opposite sides. This cutaway base brings to mind the similar base of Citicorp of 1978, in New York City. A planned public plaza surrounding the complex is stone-paved and punctuated with 400 bubbling fountains and pools (Fig. 5.10). The plaza will cover four acres of the 5.8 acre site and will be canopied by indigenous bald cypress trees. The fountains are so numerous that the plaza is virtually a water garden. "...the most extensive created since the Renaissance. It's never been done before, this type of garden." The plaza extends through the cutouts into the lobbies which reach to a 4th floor height, accommodating not only the fountains, but also the trees. Lobby floors are paved with grey, black and green granite in a pattern of geometric shapes like those of the structure.

Harry Cobb describes the tower's form:

The making of this form reflects a process which is unusual in the making of a building.... It is designed by subtraction; it emerges from this highly prismatic shape by simply starting with a pure prism of a projection of a square form up to the height of the flight path limit (Dallas Love Airport).... Starting with the idea that we can't go any higher, we have to do something within that height and within that basic volume to give it distinction and identity. The process was simply one of carving that prism away in plan and in section. It is the combination of the two that create the form of the building. But it's cut in two dimensions simultaneously and cut rigorously on a particular geometry—that is to say, the diagonal of a double square, both in plan and section. It isn't really a small object, it's huge and made of an infinity of parts. When you are making an object that is based on pure geometry, you have to devise the
piecing together of that infinity in such a way that they fit perfectly into that geometry. You are working in three dimensions. The perfection of that geometry exists only in one plane—the surface plane of the object. It is for that reason that the curtain wall of this building is designed the way it is—as a perfect plane with no projections and no recesses of any kind. 23

CBM Engineers, Inc., Houston, designed an innovative steel structural system for the unusual and complicated building. Although, "this was the heaviest building job (they had) ever worked on..." the steel used was lighter than a more conventional design would have required. 24 More than 1/2 the total required amount of fabricated steel went into the first five levels alone. The remaining fifty-three levels were difficult to place, because of the unusual floor shapes that result from the building's design (Fig. 5.11).

This complex skewed rhomboid shape is structured in an all steel frame behind the uninterrupted glass curtain skin. The most crucial element to the framing was a "megatru 25 ss"—specially designed to the specific needs of the structure. The megatru 25 ss begins at the 5th level and runs up the building's two wedged-shaped sides, turns the corners, and continues up the top vertical faces. The megatru 25 ss consists of subtrusses placed at diagonals, and wrapping the structure. It was essential that the diagonals match the slope of the building and intersect between floor lines so that they would be kept parallel with the geometry of the structure. Vierendeel trusses (three on each face of the building) act as chord members to the main megatru 25 s. This framing system eliminates the need for internal bracing, providing a flexibility in floor planning. To prevent twisting or torsion of the opposing angled shapes, an eight-story-high welded frame and also a triangular welded "hat truss" were created then welded to the upper
portions of the building. Because all vertical alignment was critical in
the structure's erection, the steel placement was precisely determined by
siting with four lasers located at the corners of the basement (Fig.
5.11). 25

At the base of the structure, the entire load - weight of the building
is carried by only eight perimeter columns. Two columns at each of two
opposite corners are joined together to form pylons. Although the building
was complex to frame, with its dramatic angles and precise geometry, the
structural system became very efficient because of the huge megatruss and
the need for very few columns. 26

The curtain wall covering that was selected underwent a series of
stringent tests before placement. "The 500,000 sq. ft. glass envelope for
the tower is the largest silicone curtain wall system ever erected," its
fabricator, H.C.B. Contractors of Dallas, believes. 27 Silicone sealant
bles 6 ft. by 12 ft. slabs of glass to a grid of silver mullions. A
secondary grid with narrower green mullions is superimposed making each
unit 3 ft. by 6 ft.. The horizontal spacing of the mullions every 3 ft.
allows flexibility in office space planning. 28

Criswell and Campeau, with Harry Cobb and Associates, succeeded in
their desire to create a landmark and a city gathering place.

The building engages the sky as enormous carved prism which gives
the building its presence on the skyline. The building meets the
ground in quite a different way, addressing different needs. Just as the building on the skyline asserts its height and
profile as a volume, when meeting the ground, this same volume
gives way to space. Space for people, space for trees, space for
light, space for water, space for the amenities which, through
their engagement with the building, give the entire project a
distinctive character at street level. 29
SUMMATION

One can compare all three of the firms' structures that define the Dallas skyline and recognize that Harry Cobb and the firm of I. M. Pei & Partners sense a civic responsibility to the architectural integrity of their buildings within the Dallas architectural fabric. This is evident in the design, for example, of One Dallas Centre's shape that is actually a synthesis of the city street grids; with the Allied Bank Tower's dramatic uplifting angled surface calling attention to itself as the city's landmark entrance gate to the CBD; and by the ARCO Tower's placement at the corporate heart of the city.

The firm's three structures reflect the physical environment by presenting themselves as members of the Dallas-built aesthetic as they plot a diagonal path across the skyline. One Dallas Centre reflects the historical reference to the actual growth patterns of the city. The ARCO Tower repeats the triangular shape of the angled center of the city. The Allied Bank Tower stands as a beacon looking out toward the grand north side of the city suggesting a dynamic flight path. It is truly a landmark for the skyline of Dallas, as the TransAmerica building is for the skyline of San Francisco.

Each of these structures embodies the strong geometric elements characteristic of Late Modern Architecture. The surfaces of the reflective planes of diamond-shaped One Dallas Centre look past its rectangular grid-encased neighbors. The triangular ARCO Tower responds, with its wedgelike thrust, to the flat faces of the adjacent Republic National Bank
and Thanksgiving Tower, on Thanksgiving Square. The vertical energy of the Allied Bank Tower pierces the sky, ascending to a pointed rhomboid spire. All three of Cobb's structures flaunt the volumetric dimensions within themselves, as they create and accent the interesting space between themselves and their neighbors. They produce a rhythm in their march across the city. The spaces that they create are just as important to the city's fabric as they are to the human requirement for intimate scale.

By relating the scale of the building to their sites, the buildings give way to open space at their bases for public use. The ground floors open to plazas which are extensions of the buildings themselves. Evident in these public structures is the design reference to one of Cobb's favorite buildings—the Palazzo Chiericati in Vincenza, Italy. The Palazzo's colonnaded front superimposed on its facade leads one to ask: "Is one to read this as the projecting porch of a private house, or as the colonnaded enclosure of a public square?" Allied Bank Tower, One Dallas Centre, and the ARCO Tower all share the fact that the space outside of the structures act as the extension of the lobby. There is the same use of architectural materials and the further imprint of the same basic design patterns both inside and out. Thus, the architect demonstrates this splendid ambiguity of simultaneously being an acknowledgement of entirely opposite intentions.

The characteristic notch of Harry Cobb is evident in all three buildings and derives from his most famous structure, the John Hancock Tower in Boston. This device accentuates the weightless verticality of the planes. Using the finest materials available in their construction, the
quality of the taut-skinned surfaces of all three buildings reflect a commitment of I. M. Pei & Partners to the development of a new architectural fabric to grace the weave of the Dallas skyline.
Fig. 8.1 One Dallas Center
Fig. 5.2 Floor plan/ Street Plan
5.3 Ground Level and Plaza

Interior of Ground Level
Fig. 5.5 ARCO Tower, Floor Plan

Original Structure on Thanksgiving Square
Fig. 5.7 ARCO Tower Surface Detail
Fig. 5.8 Allied Bank Tower
Fig. 5.9 Allied Bank Tower at Fountain Place, Site.
Fig. 5.10 Public Plaza with Fountains
Fig. 5.11 Steel Structural System
NOTES

1 Cobb Interview, I. M. Pei & Partners Office File, Dallas, Texas.
2 Ibid.
3 Ibid.
4 Ibid.
5 "One Dallas Centre" Brochure, I. M. Pei & Partners Office File, Dallas, Texas
7 "One Dallas Centre" Brochure.
9 "One Dallas Centre" Brochure.
12 "ARCO Tower" Brochure, I. M. Pei & Partners Office File, Dallas, Texas.
13 Ibid.
14 Ibid.
17 "Allied Bank Tower" Brochure, I. M. Pei & Partners Office File, Dallas, Texas.
18 Richard West, Interview, Criswell Development Company, Dallas, Texas, May 1, 1986.
19 Ibid.


21 "Allied Bank Tower" Brochure.

22 Smith, "Heavy Lifts Make Dallas Job Tough to Build," p. 22.

23 Harry Cobb, Presentation to AIA/Dallas Chapter, Allied Bank Tower, Dallas, Texas, June 29, 1986.

24 Ibid.

25 Ibid., p. 23.

26 Ibid., p. 25.

27 Ibid.

28 "Allied Bank Tower" Brochure.

CHAPTER VI

CONCLUSION

The single, most important reason for the uniqueness for the firm of I. M. Pei & Partners is, of course, I. M. Pei himself. According to his colleagues, Pei is a complex but an extraordinarily well-integrated human being. Those who have worked with him for the last thirty years believe that it is the synthesis of several distinctive qualities in him that has made possible his unique initiative in architecture. As a gifted artist, he has adhered to a rigorous standard of excellence in all projects. He knows that significant professional activity today demands simultaneous involvement in a broad range of problems beyond the capacity of one man, however accomplished, to do on his own.¹

As a self-assured and responsive individual, he has forged close and long lasting working alliances with other gifted colleagues, specifically Harry Cobb, thus creating a vehicle for the pursuit of mutual goals. Very early in his career, Pei chose not to develop a "Superstar" practice because of its limitations. He chose instead to create a pool of talent and expertise capable of taking on all problems. He and Harry Cobb have been remarkably successful because of the impressive talent assembled in the collection of first rate architects. Realizing that they too could be "Superstars", the other associates accept their relative anonymity because
they recognize that the intellectual and technological resources of the group could never be matched by single architects working on their own.²

I. M. Pei & Partners is successful because all one-hundred and sixty members in the organization share a common devotion to the highest possible standards of architectural excellence. They successfully pursue these standards by forming teams of creative talent devoted to the same objectives of problem solving.³ Pei has been able to attract the most impressive collection of experts that has been seen in any one office in the U.S.. "We must have the top technicians in our field," says Pei.⁴ He is very proud of his associates as the firm has been praised for its understanding and innovative use of materials, especially in the field of concrete and curtain glass technologies. The firm has rewritten the book with its technological advances in the improvement of building codes and by the invention of structural devices that eliminate building constraints. They have accepted the fact that a certain amount of standardization is necessary within the current uses of technology.

It has long been a truism among architects that the 'single building' in the cityscape is of no particular interest; that each commission should be viewed in the context of its neighborhood and, indeed, of its city. Yet very few architects have done more than pay lip service to this principle... I am very concerned about our cities for that reason. There are simply too many individual statements and not enough of a cohesive approach to city building.⁵

The firm's initial work for Webb & Knapp (Zeckendorf), in the 1950's, allowed them to jump right into major projects with major budgets and "learn about how cities are really put together".⁶ They came to know the rules of the building game in a free enterprise society and how to work
within those rules to achieve objectives that they considered socially, economically and aesthetically desirable. "And their clients know that when they retain I. M. Pei & Partners, they are certain to get more than a good building—they may, in fact, end up by generating the spontaneous self-renewal of the entire urban fabric." Members of the firm believe that, in order to get the total urban picture, attention must be paid to history and continuity. Buildings do not stand alone, they have urban neighbors. They must relate to the surrounding city and thus be viewed within a context. Combining vision and courage, Pei, Cobb and the firm have given form to the great urban centers as they tied together public institutions and commercial ventures with transportation and pedestrian channels for the advancement of both business and civic revitalization. Lessons in diplomacy lead the firm to identify all the self interests involved and to then persuade those interested parties to join forces for the common good.

Concerned with sensitivity to site, I. M. Pei & Partners work in the urban renewal area is far reaching as they strive to preserve the existing character of a neighborhood. Mixing of old established values with new technologies in a meaningful way weaves a new aesthetic of architectural fabric. To orchestrate the nature of a unified urban space, Pei and Cobb employ the human scale as a guidepost for the effects of monumentality. Their perfecting of detail and the use of quality materials enliven the surface of structure shapes. Light accents form. The space created gains in intensity, grandeur and importance within the framework of a single formal design.
Pei believes that:

Architects then must think of urban spaces as a sequential experience and strive to orchestrate them into an effective ensemble. They should alternate wide spaces with narrow ones, constriction with expansion, concealment with revelation so the each space intensifies and dramatizes its neighbors until, as a result, the whole becomes something greater than the sum of its parts. In this, I think, we become close at last to part of the secret of a city's visual quality.

He looks to the Baroque architects as the great space makers who translated order and discipline into the fabric of their cities. "They mirrored the strict hierarchy of life in architectural subordination and emphasis." Order, drama, and movement provide a sense of theater to the grouping of his structures.

Pei has the greatest care for architecture as an art form. Along with perfection of detailing, thoroughness and refinement of design, thoughtful planning and finesse of execution, his is a building style of sensitivity. He hopes to synthesize the character of his architecture to express an idea without imitating forms of previous epochs. Pei believes that the changes taking place in architecture today are "minor when compared with that brought about by the Modern Movement, which was not a change in style but a break with tradition."11

The influences of the four giants of the Modern Movement--Frank Lloyd Wright, Walter Gropius, Ludwig Mies van der Rohe and Le Corbusier--are obvious in the structures that both Pei and Cobb have designed in the Dallas CBD. Pei reflects:

The change came in 1937, as far as I'm concerned, when Le Corbusier came to give a speech at M.I.T. I think he stayed for two days, and those were the two most important days in my professional life. He was insolent, he was abusive, but he did
everything right as far as I was concerned. We had to be shocked out of our complacency.

Today we're too impatient. We think the modern movement has been played out and we can do one better over all of them. Well, I think it's a worthy objective. And we all should have that kind of pride and believe in ourselves. But I don't believe that one can progress by cutting off one's past. I think that the past is very strong, it has a lot of life in it.  

Frank Lloyd Wright's buildings added to his direction:

Space was the loom upon which all other elements were woven together in what he called an 'organic' unfolding of form. His buildings made room for human emotion as well as activities, imagination as well as movement, feelings as well as basic functional requirements. A rapport between space, structure, and site was set in motion as 'the inside flowed out, and the outside flowed in.'

Wright's prairie houses were an integration not only of space, structure and site but of new materials and technology. Here, he fulfilled his sense of space and simplicity by replacing walls with great vistas while not reproducing forms from other epochs or conditions. In his Larkin building of 1904 were "simple cliffs of brick" molded around a skylit great space that was flanked by several gallery-like floors, very much like I. M. Pei's Dallas City Hall. Four massive hollow piers that contained staircases and fresh air-supplying vertical ducts provided the exterior frame. At either end of this great atrium conservatories held foliage bathed in diffused light. Employees worked at long desks on the main floor or were arranged around this great hall in galleries "from which they could view the humming human machine they collectively constituted."  

Similarly, in his Unity Temple of 1905, Frank Lloyd Wright used poured-in-place concrete in the intricately reasoned spatial relationships of columns, stairs, balconies, lite-flooded patterns of intersecting
concrete ceiling beams and curtains of glass to create an idealized interior space sealed off from the outside would. Like I. M. Pei, the most resonant chord that Wright struck was his perception of space as the reality of architectural expression. It is this same kind of synthesis that Pei hopes to achieve at the Morton H. Meyerson Symphony Center.

Like Pei and Cobb, Wright tried ordering the chaotic state of our cities. Understanding both the potential allure and evil of the automobile, Wright addressed the physical, functional, and visual relationships between the natural landscape and urban sprawl with his Broadacre City project of 1934. However, the order, harmony and sense of community that Wright had envisioned never materialized.15

Pei says, "I remember when I studied under Gropius, who...was one of the greatest teachers who ever lived. Gropius was absolutely convinced that the international style would sweep the world. And he was right."16 Gropius' basic architectural philosophy is compatible with the firm of I. M. Pei & Partners' approach to the marketplace. He sees architecture as a necessary service of communal life. Through collaboration architecture is built for the good of the whole. Planning of a project is actually a series regulated to the rhythm and scope of reality as determined by various scales and intervals. The primary concern of architecture is a mediation between quality (visualizing a form) and quantity (the technical process of execution).17 Pei adds, "No school has devised, in my opinion, a teaching method, methodology, that is like the Bauhaus.18

Mies van der Rohe taught both Pei and Cobb to use materials without thinking of form. In buildings like the Barcelona Pavilion, Mies made free
use of marble, glass, onyx, and chromium-plated steel. Cobb and Pei have followed the same path. This allowed their architecture to emerge from a fulfilled technology. In addition, Mies was impressed with the play of reflections and not that of light and shadow. He sought to have the spaces between his buildings relate to those around them. Harry Cobb reflects this in his approach to placement, site and dialogue between his fifty and sixty story giants. Like those of Mies, his buildings stand aloof and closed. From the interior, however, Cobb's Miesian space goes right through the walls, opening up to the outside. This is an architecture to look out from or to be seen from a distance.

The four giants of the Modern Movement came to maturity during the first half of this century. These "form-givers" shared a belief in architecture as a primary force in culture, and thus removed references from the familiar surroundings of everyday life. Wright sought inspiration from outside cultures, while the imagery of Le Corbusier, Gropius, and Mies is taken from the machine.

As architects maturing in the second half of this century, I. M. Pei and Harry Cobb inherited this new architectural vocabulary along with a whole second generation of modern architects. These "formalists"—Philip Johnson, Paul Rudolph, Kevin Roche, John Dinkeloo, Cesar Pelli, and the firm of Skidmore, Wings, and Merrill sought to adjust the form of the first generation to a less abstract position. Over the years, each has developed his own style of modernism in his quest to attain the synthesis that characterizes his individual architecture. This late-modern effort to rethink the attitudes and forms of the International Style has gone in two
directions: the first, a rigorous, sculpturally active one; and the second, an equally rigorous form of neoclassicism.  

Transcending any formal classification among the architects of this generation is the late Louis Kahn. He was schooled in the Beaux-Arts tradition, which was devoted "to massive masonry architecture, clearly defined blocks of space, and the insistence on a solid emphatic sense of structure." He believed that before functionalism, design or even an understanding of materials must come feeling. Feeling is the form of his structures. Design then translates feelings into shapes. At the Yale Art Gallery of 1950, Kahn combined geometric shapes with exposed pipes and unfinished concrete and caused a sensation. In both his academic village—the Salk Institute of 1965, and the Kimbell Art Museum of 1973, form "characterized a harmony of spaces good for a certain activity of man." Kahn also looked at the design of cities from a structural standpoint on a scale appropriate to twentieth century problems of architecture. In this respect, Pei considers Kahn to be the most significant influence on contemporary architecture. Pei writes:

He has to be the one. You see Lou Kahn looked back and drew from the past, and you can only do that if you have great confidence in yourself. We then dare to look back into the past, to accept or to reject. And that opened up a wealth of possibilities. The Modern Movement is no longer limiting; it's now wide open. The past is our treasure. History is a continuum...

Today, architecture is dominated by Late Modern and Post Modern styles. Both look to history for their basic vocabularies and are considered Mannerist phases of Modern architecture. A Post Modern building is doubly coded—it is part modern and part something else: vernacular, revivalist, local, commercial, metaphorical, or contextual. There is an
emphasis placed on urbanism, participation, ornament and image in the
different forms it manifests. \(^{26}\) Familiar names are: Michael Graves,
Robert Venturi and Charles Moore, all well known for their house designs.
Terms like Historicism bring to mind Philip Johnson's Dunbaron Oaks in
Washington or his A.T. & T. Center in New York or even his Crescent in
Dallas—a serious look at yesterday. Straight Revivalism can, for example,
be found in the John Paul Getty Museum in Malibu. Post Modern Space grows
out of the late examples of Aalto, Le Corbusier and even Kahn's Salk
Center. \(^{27}\)

Of the many ways to characterize Late Modern Architecture, the simple
notion of exaggeration is the most exacting. Bored with modern
architecture, it has taken the International Style to an extreme to
overcome its monotony. Examples follow morphological categories ("Blank
Boxes"), historical ones ("Brutalism"), or on constructional ones
("Cages"). \(^{28}\) Pragmatic in approach rather than idealistic, Late Modern
architecture demonstrates extreme aspects of logic and mechanical emphasis,
a mannered and decorative use of technology, and an abstract rather than a
conventional language of form. The architecture of I. M. Pei & Partners
falls under a category identified by Charles Jencks as Sculptural Form.
Pei's geometric expression is apparent at the Dallas City Hall, the East
Wing of the National Gallery and the JFK Library. Jencks classifies the
controlled, hard-edge structure as an ornament approach, as evident in the
Morton H. Meyerson Symphony Center, as Complex Simplicity, while the
enclosed skin volumes of Cobb's high-rise towers are Slick Tech. \(^{29}\)

Both Pei and Cobb believe that a good building is bound to have an
influence on the city. In their approach to city problems, they
demonstrate a measure of concern that considers all possibilities: local implications, commercial and civic development, and the scale of man and the automobile. In the 1960's, Dallas was ready for a new image—a more multi-dimensional approach to its future growth. Recalls Pei: "Many of our clients really come to us because their aspirations parallel ours. We may refine our clients' goals—but those goals are usually quite ambitious even before we come into the picture." Because Mayor Eric Jonsson formulated some very far reaching "Goals for Dallas" before meeting with the firm, he basically knew what he wanted. It took very little persuasion to convince him that City Hall could be a major generator for both public and private renewal.

Today, Dallas City Hall and its dramatic park plaza are a successful realization of a cohesive, downtown civic district, acting as a link between the Convention Center, the Central Library and the downtown skyline. From Pei's great space, both inside and in front of City Hall, one will soon be able to make a visual trek across the skyline to another one of Pei's great spaces at the Symphony Center. From there, one can look back and up at the city. An architectural thread has started through the city, linking government and culture. Within these two points, the major architectural fabric of the city is contained in the shapes, detail, and applied surfaces of Cobb's three towers as they act as focal points in the weave.

Ten years ago, if one stood in Bryan Street (named for the city's founder), which runs directly east from the CBD, every high-rise structure visually straddled it. Today, with the addition of these five buildings to the skyline, Pei and Cobb have brought order, harmony and a sense of
community to Dallas. Thanks to I. M. Pei & Partners, the city has a fresh new approach to an architectural vocabulary, a breadth and energy endorsed by the city that will direct its future course. Pei says:

I think that the totality of downtown Dallas is still rather chaotic. This is what happens when you have competitive entrepeneurs, each wanting to outdo the other. I am trying not to fall into that trap, but nevertheless, there is that natural instinct to do sort of one more than somebody else. It's quite different from the days Paris was built, the days when Rome was built. And I am very concerned about our cities for that reason. There are simply too many individual statements and not enough of a cohesive approach to city building.

The fact that there is no master plan for the city and responding to the "developers' town" attitude and the generic architecture it has produced, I. M. Pei and Harry Cobb have begun to create a character for the fabric of Dallas architecture. With these five buildings, the firm has consciously established an architectural vocabulary that, through the articulation of structure, will allow a sense of place and a feeling of aesthetic unity to mature.
NOTES

2 Ibid., pp. 52-53.
3 Ibid., p. 59.
4 Ibid., p. 57.
5 I. M. Pei Telephone Interview.
7 Ibid., p. 54.
8 Ibid., p. 55.
10 Ibid., p. 72.
11 Barbaralee Diamonstein, "I. M. Pei: 'The modern movement is now wide open,'" Art News, 67 (Summer, 1978), 65.
12 "I. M. Pei on the Past and Future," The Christian Science Monitor, April 29, 1985, p. 34.
15 Ibid., p. 216.
16 The Christian Science Monitor, April 4, 1985, p. 34.
18 The Christian Science Monitor, April 4, 1985, p. 34.

21 Ibid.


23 Ibid., p. 285.

24 Ibid., p. 294.

25 Diamonstein, "I. M. Pei: 'The modern movement is now wide open,'" p. 65.


27 Ibid., p. 110.

28 Ibid., p. 21.

29 Ibid., p. 20.


31 I. M. Pei Telephone Interview.
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