THE LIVING SKYSCRAPER: MAPPING THE VERTICAL NEIGHBORHOOD

by:
Tom Lee
Bachelor of Science in Architecture
University of Cincinnati, 2001

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signature of author _____
Department of Architecture
May 19, 2004

certified by _____
Andrew Scott
Associate Professor of Architecture
Thesis Supervisor

accepted by _____
William Hubbard, Jr.
Adjunct Associate Professor of Architecture
Chairman, Department Committee on Graduate Students

THESIS COMMITTEE

Andrew Scott, RIBA

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Thesis Reader
Associate Professor, Building Technology

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ABSTRACT

The rise of the skyscraper was not driven by programmatic needs or artistic desires, but rather economic conditions coupled with turn-of-the-century technological innovations. As it evolved, systems matured to provide comfort and safety while economic efficiency was always prioritized. The skyscraper and its systems reached its evolutionary plateau in the 1950s when mechanized systems transformed the building type into air-tight homogenous structures, maximizing efficiency and economy. This was based on an office culture that today, due to innovations in communications technology, is growing ever more obsolete.

However, as cities continue to grow, skyscrapers are increasingly residential. In fact, residential skyscrapers can have population and land areas similar to city neighborhoods, yet lack any character or identities that give neighborhoods diversity. Despite vast functional differences, residential towers are only slight modifications of their office tower ancestors - some superficially domesticated via the use of brick and gable roofs. Appearance does not account for the lack of diversity and opportunities for social interaction. The concept of a "residential skyscraper" is currently an oxymoron: the neighborhood which requires diversity is housed in a building type that is notoriously homogenous.

This thesis reconceived the skyscraper as a vertical neighborhood – a dynamic network of communities in the sky. The inverted design process prioritized the community by focusing upon the internal social and spatial systems of the skyscraper – two systems that are essential to fostering a community yet do not currently exist as design considerations. Therefore, they are not included within the conventional catalogue of systems, and the problems associated with them, that traditionally define the building type.

The influence of this prioritization also redefined the currently parasitic relationship of the skyscraper to the city into a symbiotic one: the living skyscraper becomes part of an urban food chain, dependent on the environment to insure its own survival, and on the city to provide identity and culture. The design exploration thoughtfully integrates systems as a result of a social agenda, creating a dialogue that raises questions and aspirations about the social validity and potential of the skyscraper as it exists today.

Thesis Advisor: Andrew Scott
Title: Associate Professor of Architecture

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how can a diverse neighborhood and its community thrive in a building type notorious for its homogeneity and lack of social interaction?

This question surfaced as a result of the body of research presented here. This research represents a broader searching for the essence of the skyscraper problem which this thesis suggests is the lack of the social and spatial systems of the skyscraper, and their synthesis with conventional systems such as sustainability, structure, circulation, and/or ventilation – systems that other reinventions focus solely on and in an individual manner. The social problem is exacerbated by a residential program, but applicable in varying degrees to practically any other program type.

The value of this thesis is not a prototypical model for a new kind of residential tower, but rather a critical evaluation of the skyscraper design process, and therefore the appropriateness and validity of the conventionally prototypical approach to skyscraper design. What emerges is a line of questioning that looks beyond the conventional systems and their associated problems that comprise the skyscraper, and therefore challenge the conventional notions as to where the problem of the building type actually lies.

pancakes and refrigerators *the skyscraper problem*

The skyscraper as a building type is unique: its rise was not the result of programmatic needs or even artistic desires, but rather a function of primarily economics and the technology that let it happen.

At the turn-of-the-century, economic conditions were ripening as the telephone allowed offices to move away from their production facilities and into concentrated areas of business – city centers. Land values paralleled the increase in demand for downtown land, and structural advancements in iron and later the steel frame quickly followed in development. Together, these conditions created the ideal conditions for the birth of the tall building.

Elevator technology naturally followed and matured relatively quickly to provide a more reliable and safer method of traveling vertically. As the elevator allowed the tall building to grow even higher, more and more the first floor became a sea of elevator shafts and lobbies.

Skyscraper form was shaped at first by an extrusion of the site, and later height became problematic in the form of shadows and natural light. Small sites restricted height limitations, and eventually entire city blocks were incorporated to allow buildings to rise even higher. It was soon realized that these taller buildings deprived the streets and neighboring structures from natural light. To combat this, New York enacted its zoning code in 1916 requiring setbacks, while Chicago placed a ceiling on building heights.

Requirements for daylight and air inside the tall building limited floor depths and with sites, required light courts that allowed light and air to reach deep into the buildings, epitomized in John Wellborn Root's Rookery of 1888

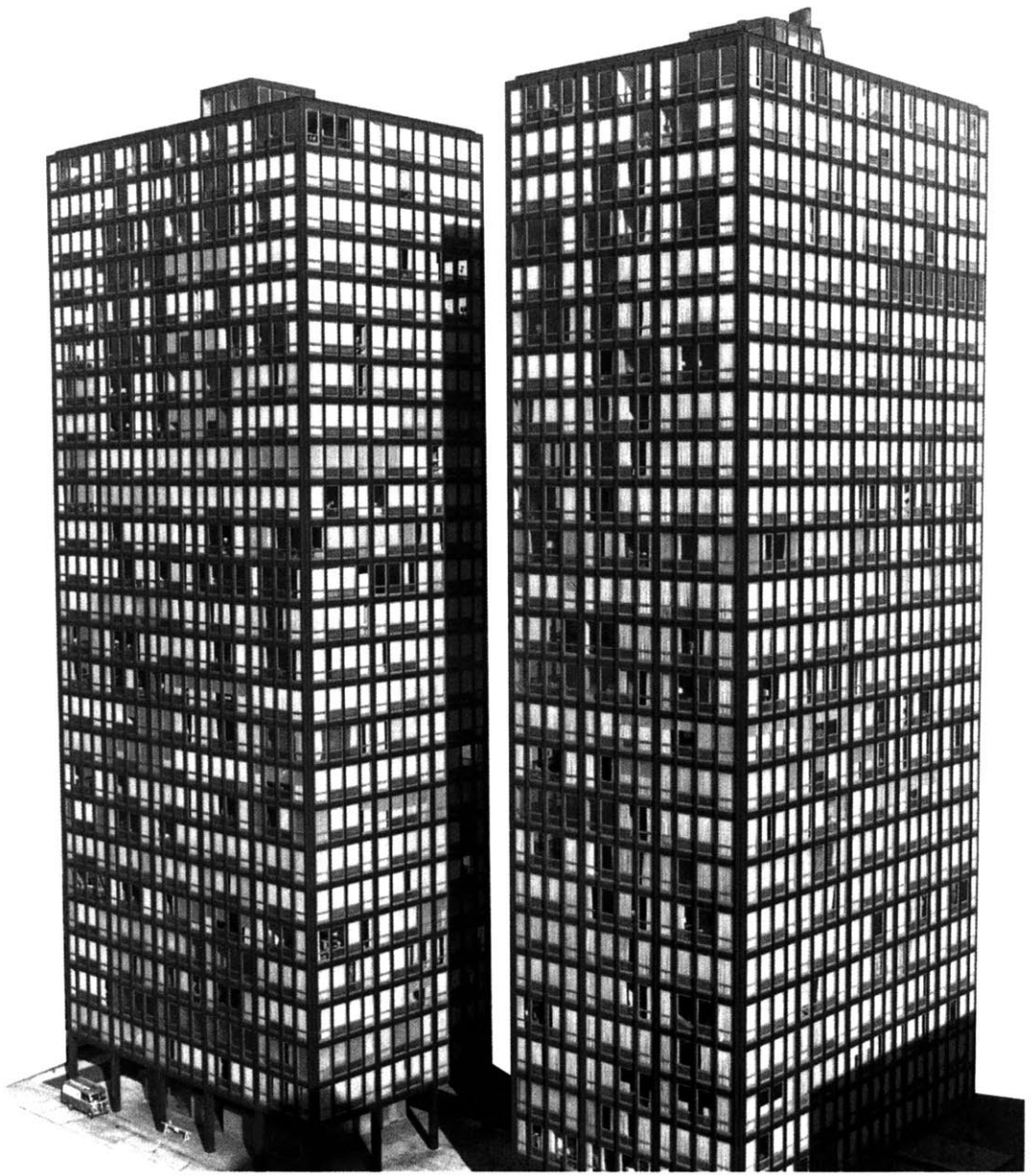

FIG. 1.1 860 880 Lake Shore Drive, Mies van der Rohe (1951).

in Chicago. This rather fluid relationship between design and a dependency on the environment would ironically become a goal of the sustainability movement almost a century later.

Post World War II mechanization in the 1950s brought about a revolution in skyscraper evolution, becoming its most efficient model while marking the complete divorce of the building type from the natural environment. This also marked the skyscraper's evolutionary plateau as the building type, and all of its fundamental problems, has not changed in nearly half a century.

As a result of Modernism, simple geometric extrusions were favored over setbacks. This created more diagrammatically a repetitive series of identical floor plates, creating a homogenous series of spaces stacked one upon the other like "pancakes," without any real connection between one floor and the other.

The skyscraper also addressed contemporary organizational culture, which consisted of large organizations with clearly defined hierarchies requiring large floor plates. These models placed around a central mechanical core support staff for the executive offices that sat around the perimeter of the floor.

These deeper floor plates were made possible by curtainwall technology and the fluorescent light bulb. The former allowed floor-to-ceiling glass providing the maximum amount of daylight into the building while the latter provided light that didn't emit a tremendous amount of heat for the rest of the occupants.

Two great paradoxes result in this arrangement: the inoperable glass façade did allow more daylight but no air to penetrate the building. Additionally, the deeper floor plates negated any real advantage of the floor-to-ceiling glass, requiring a constant dependency on artificial fluorescent light even during daylight hours. Second, the added daylight also resulted in added heat. To borrow from Kenneth Yeang, this irony resulted in the "refrigerator" concept because spaces were air-conditioned to deal with the heat.

Throughout skyscraper history are attempts at reinventing the skyscraper, perhaps acknowledging some of the fundamental flaws of the building type. Many attempts at revisiting the skyscraper concentrate on individual systems including structure, façades, sustainability, technology, and life safety. In fact as this thesis suggests, the synthesis of all these systems is a fairly complex one, creating a series of networks and relationships that are endlessly intertwined.

If 1950s mechanization marked the skyscraper's first renaissance, then perhaps we find ourselves at the birth of a second. Events like September 11th and the 2003 fire at 69 West Washington Street in Chicago which resulted in 6 deaths created a renewed interest in the building type by raising questions of life safety and even iconography. Depleting fossil fuel supplies and therefore rising costs also have sparked an interest in sustainability – creating environmentally friendly buildings by conserving and even generating energy via renewable resources.

Interestingly enough, telecommunications technologies in the form of the Internet and mobile communications technologies are once again changing the shape of business culture, by changing the ways people work and renewed

requirements on the workplace. As more people become mobile, meetings and social interaction become more important as time together is growing ever more limited. This change is placing more dynamic requirements on space to help foster communities and encourage social interaction.

The skyscraper is viewed by most architectural schools as prohibitive or limited in its potential due to its reliance on economics and technology. The skyscraper is the only building type where the vast majority of space is not designed but passed onto another architect. Therefore, lacking are the social systems and spatial richness that are fundamental to practically every other building type. This may explain why few if any attempts at revisiting the skyscraper have ever addressed the social and spatial problems of the skyscraper.

Perhaps this is attributed to the fact that although these problems exist, the social and spatial systems of the skyscraper as design considerations do not yet exist.

With the complexity of the various disciplines involved, the role of the skyscraper architect lies greatly in systems synthesis, and the role of designer is reduced to façade, core, and lobby design – all of which are fairly standard components from tower to tower. To recall the aforementioned systems of structure, façades, sustainability, technology, and life safety, all these systems involve themselves with only façade and core design – the design elements architects have been limited to.

Reconsiderations of these individual systems are certainly valid, but difficult to justify whether one is an improvement over the other. The following discussions and explorations primarily address the social and spatial systems of the skyscraper, addressing the fact that the homogenous spaces of the skyscraper do not address the diversity of users, and the ever more diversifying ways of using space. While the social and spatial systems are prioritized, the other systems are forced to react, seeking solutions that fit a socially interactive agenda.

the bioclimatic skyscraper artistically considered

As architecture is inundated with journals and publications celebrating achievements in 'sustainable' or 'green' architecture, the means of evaluation have shifted.

Rarely do discussions include such intangible qualities as beauty, symbolism, or iconography. Favored are energy efficiency and building performance, and particularly with skyscraper architecture this translates into technological innovations.

Perhaps sustainable architecture is so 'innovative' that periodicals and publications have time only to react to innovative or unprecedented practices. Generally, publications feature work by green architects in praise of the technology that make the accompanying green rhetoric technical and therefore tangible. Contextual response is judged in relationship to the natural environment, yet they also neglect to evaluate the aesthetic value and relationship to the immediate built environment and culture.

In the exhibit "Big and Green: Toward a Sustainable Architecture in the 21st Century," curator David Gissen features several ecological high rises briefly outlining the green initiatives of each project but never once mentioning the resultant aesthetic quality. For instance the High-Rise RWE AG (fig. 1) in Essen, Germany, discussion is limited to the diagonally-ventilated facade and energy performance. Never discussed is the rather rare instance where the architect Ingenhoven, Overdiek, und Partner also designed the entire interior in order to preserve a consistent design aesthetic. Not to mention the dynamic, ephemeral appearance of the double-glazed facade that softens the first major landmark tower in Essen.[1]

1. Briegleb, Till, ed. "Ingenhoven Overdiek und Partner: High-Rise RWE AG Essen."

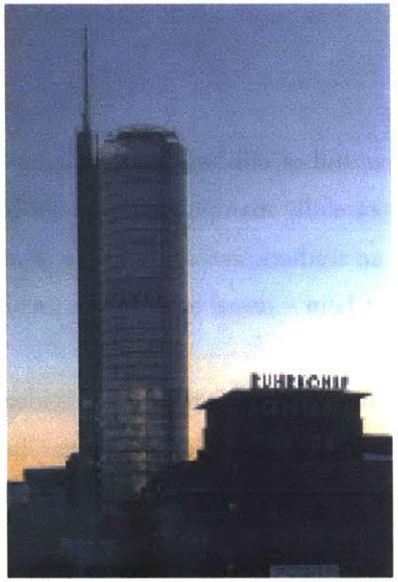

FIG. 2.1. RWE-AG Tower, Ingenhoven, Overdiek, und Partner (1996).

There is only a handful of tall-building architects who are truly walking on the cutting edge of sustainability via technology. They carefully manipulate the malleable stasis that exists between environmental performance and an inherent need for an aesthetic and artistic style. The processes of three of these architects – Kenneth Yeang, Norman Foster, and Helmut Jahn – reveal how various architects treat this balance differently.

At a glance, the perception is that their work is identical – all use technology to achieve environmentally responsible design. Yet more careful examination reveals varying approaches: Yeang relies heavily on site to determine building orientation, Foster uses a consistent design methodology to achieve diverse results, and Jahn synthesizes developing technologies through engineering and design.

These three distinct agendas and attitudes towards technology result in stylistic signatures. What follows is an evaluation of the training and process of Yeang, Foster, and Jahn, and how these factors undoubtedly influenced the hand of these architects, and therefore their subtle aesthetic sensibilities.

KENNETH YEANG – BUILDING BILLBOARDS

Kenneth Yeang coined the term 'bioclimatic skyscraper.' 'Bioclimatic' referring to its biological and organic role (and aesthetic); 'skyscraper' simply defined by Yeang as a building with a small footprint, small roof area, and very tall facades. Additionally, skyscrapers require special consideration to systems design that their mid-rise counterparts do not.[2]

2. Scott, Andrew. *Dimensions of Sustainability*. p. 109

Yeang finds it important to define the skyscraper, as well as his ecological principles. Similar to William McDonough, his writing is intended to educate readers about the importance of his work and its justification, and the built work serve as living billboards that attest to this rhetoric. Much of his work features 'veggies,' or vegetation distributed throughout a skyscraper, serving a functional purpose of neutralizing carbon dioxide emissions, and an aesthetic purpose calling attention to his buildings' ecological role. He admits that his architecture has gone through a few stages of metamorphosis, from a 'high tech' in the 1990s to a more biological or organic architecture today. Comparisons of his work to the Japanese Metabolists or more commonly to the work of Britain's Archi-gram should come as no surprise.

Educated in London, Yeang attended school in the early 1960s, and joined the School of Architecture at London's Architectural Association in 1966.[3] He was attracted to the AA for its contemporary leadership and attitudes towards the future and technology of architecture, under members of Archi-gram including Peter Cook[4], Ron Herron, David Green, and Cedric Price.[5] He then went to Cambridge to study the sciences and the environment, and finally finished at Penn studying landscape under program director Ian McHarg.

Academic influences however not only have an obvious effect on his aesthetic, but perhaps more so towards Yeang's process. Yeang and his firm, T.R. Hamzah and Yeang, make an explicit commitment to 'RD+D,' or Research Development and Design. Currently, this research is focused more towards what Yeang terms 'biomimesis' – designing or learning by imitating nature – and 'ecomimesis' – designing using analogies of ecosystems and ecology.[5] This line of thinking is coupled with consideration of skyscraper design as urban design. "In a single building you

3. Balfour, Alan. "Architecture for a New Nation." p. 8
4. Cook was and remains one of Yeang's most important critics – he has since departed into another area of architecture although according to Yeang, "Peter also likes to put veggies in his buildings."
5. Rappaport, Nina. "Kenneth Yeang: Building Cities in the Sky." p. 175

FIG. 2.2. Menara Boustead, Kuala Lumpur, Malaysia. T.R. Hamzah and Yeang.

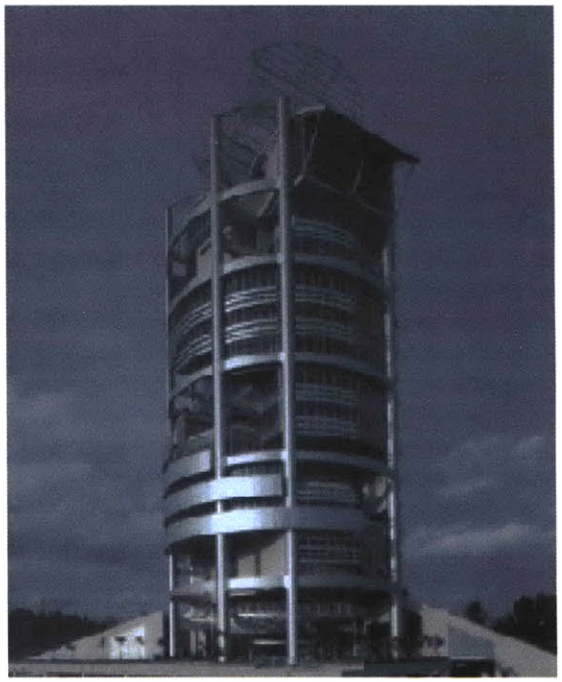

FIG. 2.3. Menara Mesiniaga Tower, Selangor, Malaysia. T.R. Hamzah and Yeang.

can have something like 10 to 15 acres of built-up space, as in the World Trade Center. If you think of designing 10 to 20 acres of land area, you would approach it as an urban design project, not just a building project."[6] This move towards urban ecosystems, and of course the aesthetic that reveals what the architecture is doing, results in somewhat chaotic architecture, full of multiple circulation patterns as part of a network or more urban environment – sometimes up to 4 options of circulation.[7]

Alan Balfour in his essay "Architecture for a New Nation," comments that Yeang's most recent work seem like 'armored figures preparing for an as-yet-undefined task, somewhat uneasy of their ecological responsibility."[8] Yet Balfour also points out that the work achieves a cultural expression as well. Comparing Yeang's situation to that of a young Eero Saarinen who entered architecture as Finland emerged as a nation, Yeang found himself in architecture school as the Federation of Malaysia was incorporated in 1963.[9] Similar to Saarinen who saw Finland's future in architecture, Yeang's work according to Balfour is embedded in an emerging unique Malaysian culture. Ivor Richards in his essay "The Tropical High Rise," contends that this contextual response is not an issue of style or aesthetic in a traditional sense. Rather, it is a response to a dynamic set of design factors – wind, air, light, and context, shaping overall form and dictating careful placement of loose-fit membranes and skins with attachments such as sunshades.[10]

Richards continues that Yeang's body of work can be divided into two parts – sunpath projects where elements such as location of service cores and glazing are dictated by solar exposure and wind rose projects – which involve the opening up of plans to allow for air flow and natural ventilation in respect to prevailing wind patterns.[11] More

6. Rappaport, p. 176
7. Rappaport, p. 177
8. Balfour, Alan. "Architecture for a New Nation." p. 7
9. Balfour, p. 8
10. Richards, Ivor. "The Tropical High Rise." p. 14-15
11. Richards, p. 11

recently, however, Yeang is combining these elements and incorporating them into his project as what he calls 'eco-cells' – voids in a building to provide light, rainwater, vegetation, and natural ventilation. This integration is really a result of an obvious search for a skyscraper style, whose evolution reveals a developing artistic maturity paralleled with advances in technology and ecological objectives.

The first 'hairy' building of Yeang's – the Menara Boustead of 1986 is a sunpath project located in Kuala Lumpur in Malaysia. In an effort to eliminate stacked concrete pancakes, continuous voids located at the corners rise all the way up the tower creating vertical linkages, allowing for shading and full height glazing within these 'skycourts.' The configuration responds to the sun, locating service cores on the west and east sides as well as sun shading on all glazing with similar orientation.[12]

The Menara Boustead though is quite obviously a precursor to the Menara Mesiniaga Tower of 1992. The former features an aluminum clad extrusion with a language of punched openings and vegetation applied as an indicator of the building's ecological role. Additionally, the continuous vertical voids do little to eliminate the pancake effect, as any opportunity to create a more fluid vertical flow is absent.

The Menara Mesiniaga Tower (fig. 3), however, is a low-energy building that features a series of voids that spirals up the tower. Various terraces open out onto the voids that are more carefully landscaped, and create a much more effective spatial flow from one floor to the next. The future is also evident in these voids and seemingly superfluous canopy on top of the building that could be potentially used for solar cells and building extensions.[13] The tower also

12. Yeang, Ken. "Bioclimatic Skyscrapers." p. 43
13. Yeang, Ken. "Bioclimatic Skyscrapers." p. 59-63

features an additive vocabulary of elements reminiscent of the work of Archi-gram. Yeang separates a super structure and articulates various degrees of north and south facing glazing and openings. This vocabulary more accurately reflects the additive nature of design considerations that the Menara Mesiniaga Tower responds to.

The Tokyo-Nara Tower (fig. 4) continues the principles illustrated in the Menara Mesiniaga Tower, but introduces a rather irrational artistic series of movements that is more prevalent in his most recent work. Intended as more of a research project, the tower features spiraling vegetation once again in order to help balance mechanical systems and air flow. These gardens in the sky as a result of the spiraling voids serve as the building's lungs, and use robot arms that move up and down the building to care for vegetation and maintain the facade.[14] The floor plan and its irrational layout show an eclectic derivation of geometry of curves and angles in plan, Yeang's first departure from his rigid, perhaps overly scientific approach to a more random design vocabulary of his own.

Yeang considers his EDITT Tower of 1998 (fig. 5) to actually be his most successful at integrating engineering, design, ecological, and social issues. Along the same lines as his Tokyo Nara Tower, it is a more realistic proposal for a tower yet is unbuilt. It remains to be seen if proposals such as this one reveal an effective synthesis of aesthetic design and a sustainable agenda. Characteristic of several other works, the EDITT Tower consists of layers of screens, circulation, spires, shapes, and vegetation that indicate a desirable irrational artistic sense. It is present here, unlike his Chicago based counterpart.

14. Yeang, Ken. "Bioclimatic Skyscrapers." p. 118-121

HELMUT JAHN – THE SECOND CHICAGO SCHOOL

Helmut Jahn continues the line of exploration began by the early Chicago architects. Focused on the engineering aspects of architecture, his work as Werner Blaser insists is representative of "a symbiotic collaboration between architecture, engineering, and building technology."[15] Jahn and engineer collaborator Werner Sobek coined the rather cliché term "Archi-neering" that references architecture's dependency on engineering and technology – an approach that is much more mature in contrast to his earlier post-modern work.

Infamous for his expressive post-modern skyscrapers in the heyday when New York-based Kohn Pedersen Fox and Murphy/Jahn were in constant competition, it is Murphy/Jahn who unquestionably came out on top. But this was not without criticism as critics labeled him with nicknames such as 'Genghis Jahn' and 'Flash Gordon'[16], for his superficial use of technology simply from an aesthetic standpoint, resulting in what Huxtable calls 'zoot-suit' architecture.[17] Jahn himself acknowledges post-modernism's deficiencies, stating that "the buildings created during those years were like old ladies with too much jewelry."[18]

Today, Jahn's work has perhaps reached a final stage of maturity in terms of having defined a clear methodology that practices a pure, technologically engineered design, void of any architectural theory. This maturation has emerged during a career spanning over 35 years and is preceded by formal training and education heavily influenced by the likes of Mies van der Rohe and Fazlur Khan.

Born in Nuremburg, Germany in 1940, Jahn graduated in 1965 from the Technische Hochschule in Munich.[19] He credits the Technische Hochschule for providing him a pragmatic approach to architecture, never discussing

15. Blaser, Werner. *Helmut Jahn: Architecture Engineering*
16. When this comment was made, Jahn who was so involved in his work and most likely still naive to American pop culture, reportedly asked his wife Deborah what 'Flash Gordon' meant. His wife, an interior designer who's most renowned work was Helmut Jahn, told him he was a fictional character. Surprisingly, Jahn took a liking to it, and named his competitive sailing yacht and all other subsequent ones, "Flash Gordon."
17. Huxtable, p. 82
18. Jahn, Helmut. *Archi-neering*. p. 101
19. Blaser, Werner. Helmut Jahn: Architecture Engineering. p. 10

history or theory. For one year after graduation, he worked under Peter von Seidlein whose connections in Chicago coupled with increasing publicity directed Jahn to pursue graduate studies at the Illinois Institute of Technology. Under the influence of Myron Goldsmith, Fazlur Kahn, and the heavy hand of Mies van der Rohe, IIT introduced Jahn to a new line of thinking that included primarily explorations with structure, space, and materials. With little emphasis on form, Jahn developed a design vocabulary dominated by the functional, technical, and aesthetic issues of architecture.[20]

In 1967, Jahn worked as the assistant to Gene Summers at C.F. Murphy and Associates.[21] Having produced a new McCormick Place to replace the previous one that had succumbed to fire, Jahn credits this project as his first attempt to depart from a very strict Miesian aesthetic: "Since 'God was in the details,' – if you wanted to change religion, you changed the details. Many of the explorations occurred on this level, primarily on the skin and the structure."[20] Although similar to Mies' National Gallery in Berlin, the all black structure did signal a departure for Jahn, as he was placed in charge of design for the firm shortly after the project's completion and henceforth began his bold use of color that still lingers even in his work today.

Paradoxically, Jahn today has returned to his roots – favoring all black attire and focusing attention back to the details primarily at the level of skin and structure. His post-modern work is seemingly a detour in his development and maturation as an architect, but some of the aesthetic sensibilities and certainly boldness will re-emerge in his most recent work.

20. Jahn, Helmut. "The First 20 Years." *Architecture and Urbanism.* p. 10

21. Murphy, who had played a major role in shaping several Chicago landmarks including O'Hare International Airport, the Prudential Tower, and the First National Bank Tower, also designed the first McCormick Place. When McCormick Place burned down, Mayor Richard J. Daley requested Murphy to design a new McCormick Place, and asked Summers along with his assistant Helmut Jahn to join the firm.

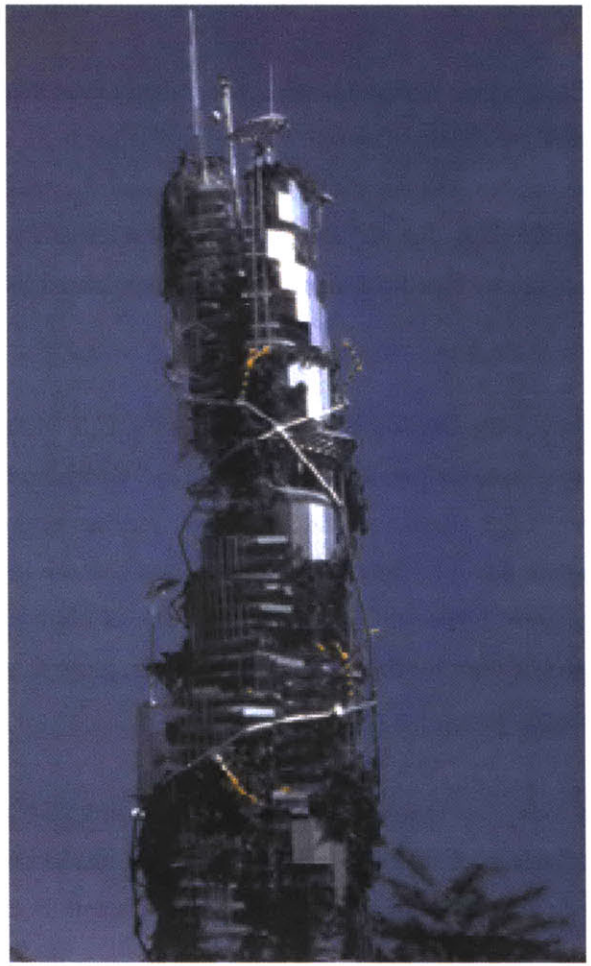

FIG. 2.4. Tokyo-Nara Tower. Tokyo, Japan. T.R. Hamzah and Yeang.

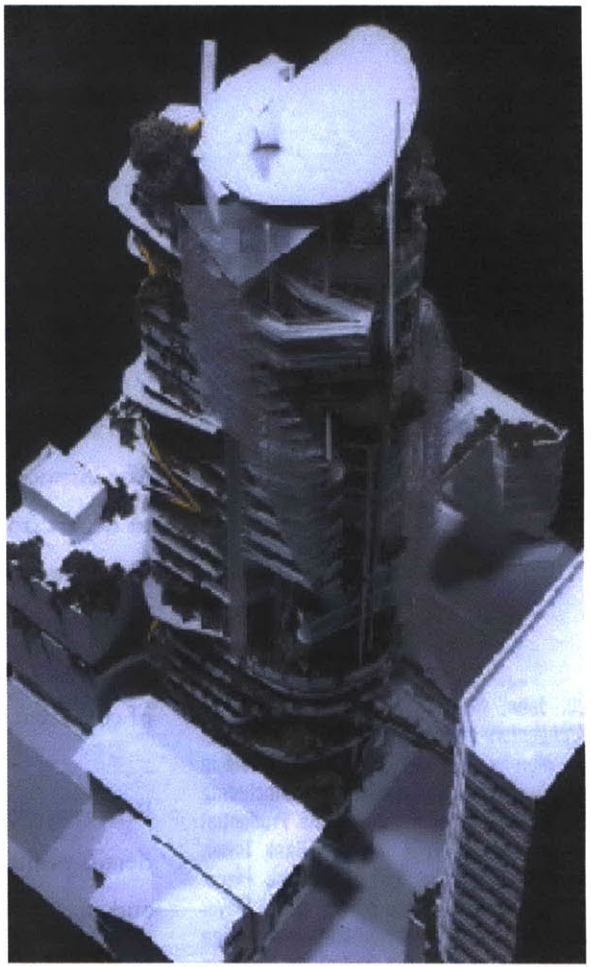

FIG. 2.5. EDITT Tower. Singapore. T.R. Hamzah and Yeang.

The turning point for Jahn came in 1997 with his Reedy Creek Improvement District Building (fig. 6) in Buena Vista, Florida.[22] Jahn's characteristic bold moves are only formal, taking a cube and chamfering the corners, justifying the gestures by creating entrances and skylights. The extremely clear double-glazed facade spans from floor to floor with practically no spandrel panel, maximizing daylight. Of most interest in this project are the extended trellis or screen walls that recall the original geometry of the building yet also places visual emphasis on the facade as a layer. There is a newfound importance placed on the facade and its details, with a respect to daylight and the environment.[23] What has yet to be revealed is the facade's role as a climatic barrier, using the double-glazed facade as an opportunity to bring natural ventilation into a building.

Reedy Creek also foreshadows Jahn's renewed interest in structural expression as well, using angled columns to resolve the chamfers. Jahn adapts a similar formal vocabulary used in Reedy Creek on his 21 Century Tower in the Pudong District of Shanghai.[24] Jahn characteristically integrates structure and expression, using a bright red colored structure that uses diagonals to brace the frame. On two sides, these chamfers that correspond to the diagonal bracing slice the pancaked floor plates to create triangular voids which serve as atria. This gesture, however, illustrates what remains as one of Jahn's most striking deficiencies.

Similar to the question of which came first – the chicken or the egg, this design begs to question whether it was really a socially driven intention to create these atria[25] or reminiscent of early Helmut Jahn, an arbitrary aesthetic decision to needlessly express the structural form. It seems likely it was more the latter, because it is a speculative office tower designed by a Chicago architect. Additionally, it is by nature that all floors facing the atrium have to have a glass

22. Jahn, Helmut. "Architecture/Engineering." p. 11
23. Jahn, Helmut. "Architecture/Engineering." p. 13
24. Dobney, Stephen, ed. Murphy/Jahn: Select and Current Works. p. 50-53
25. This project was originally proposed to a different Chinese client, and then reproposed for the current client to be built in Shanghai's Pudong District. These vertical atria did not have natural ventilation as in Foster's Commerzbank, and featured red steel trees.

enclosure to separate various tenants. This translates into only one tenant – those with direct access,[26] who have the only benefits of the atria as an added spatial amenity. In order to access these atria, one would have to take an elevator in the central core and walk through a different office to use that space.

21 Century Tower perhaps marks what is the end of the post-modern Helmut Jahn. Aesthetically, it is one of the last towers Jahn has designed where a superficial aesthetic desire results in a questionable space. It also remains as one of Jahn's last attempts in using varying colors of glass, albeit in a much more subtle manner. And perhaps most importantly in the bioclimatic discussion, it is also one of his last towers that is hermetically sealed, i.e. relies entirely on mechanical ventilation. His most recently completed tower – Deutsche Post in Bonn, Germany – seems to resolve all the issues of aesthetics, structure, form, and facade in only the best tradition of the Chicago School.

Deustche Post (fig. 7) represents for Jahn a maturity and refinement that illustrates a sensitivity to intangible perceptions. A modified ellipse in plan, the challenge offered by Sobek in response to the surrounding landscape of the site was "do something soft."[27] Gently curving facades that extend well beyond interior space further the emphasis on the enclosure, as well as de-materializing the building by blurring its edges. The southern facade is double glazed with a canted secondary enclosure that reflects the ever-changing sky, further meant to soften the appearance of the building. A three-story base building with extended roof canopies mark entrances and provide a sense of scale – an issue that plagues Jahn's designs.

This sensitivity is also translated into creating public spaces in a speculative office tower that seemingly should prove

26. Atria occur on opposite corners of the building and parallel each other. This translates to one floor plate that has access to both atria and no others.
27. Jahn, Helmut. *Archi-neering*. p. 101

fairly successful. Deutsche Post is essentially two towers, joined together by open atria that occur every 5 floors. Split elevator cores ensure a clarity of the two towers, yet maintains an uninterrupted corridor –like space that joins the two sides together, ironically using the void between the 'towers' to unify the entire tower with properly scaled public spaces. All tenants have access to the various atria, and only time will tell of its success.

Jahn's newfound attention to public spaces in the tower for social interaction is preceded by the work of London's Norman Foster, who has consistently used the social approach as a basis for his design methodology.

NORMAN FOSTER – "ARCHITECTURE IS ABOUT PEOPLE"

Perhaps one of the greater ironies lies in the title of an exhibit at the Museum of Applied Arts in Cologne titled, "Norman Foster: Architecture is About People."[28] Ironic because Foster readily admits that he grew up in 'social isolation,' with his intelligence and academic desires essentially excommunicating him from his working-class background, and his working-class background excluding him from the dominant middle class at his Burnage High School.[29]

Foster was born in Levenshulme, England, in 1935. His 'social isolation' began during World War II, when his father had to work in an airplane factory at night, and his mother had to take a job during the day leaving Norman to be looked after by neighbors.[30] He kept to himself for the most part, was never good at sports, [31] and built model aircraft from Balsa wood eventually graduating to those with carbon dioxide motors. He was fascinated with bicycles and their assemblies, automobiles, and of course airplanes, and enjoyed good grades in school.

28. Foster and Partners press release 25 October 2001
29. Quantrill, Malcolm. "The emergence of an architect." p. 3
30. Quantrill, Malcolm. "The emergence of an architect." p. 4
31. Foster didn't exercise regularly until 1979, citing his understanding that many architects lived short lives due to immense amounts of stress and working hours. This exercise routine, which included bicycling and running, emerged coincidentally at the same time as the Hong Kong and Shanghai Bank Tower.

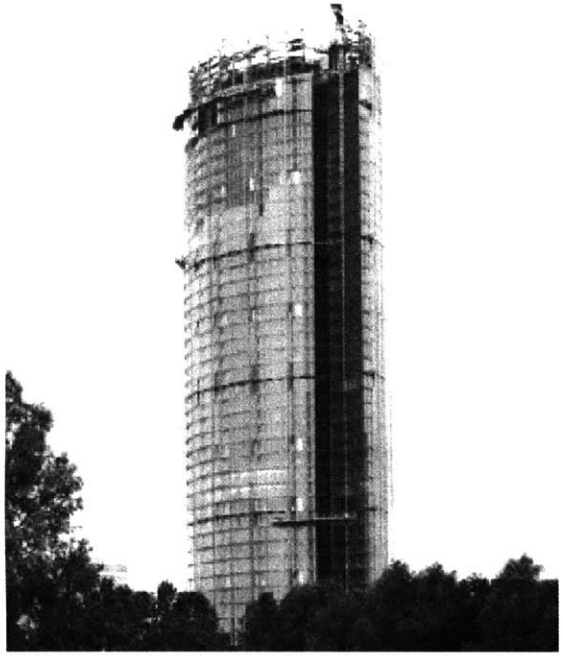

FIG. 2.6. Zentrale Deutsche Post, Bonn, Germany. Murphy/

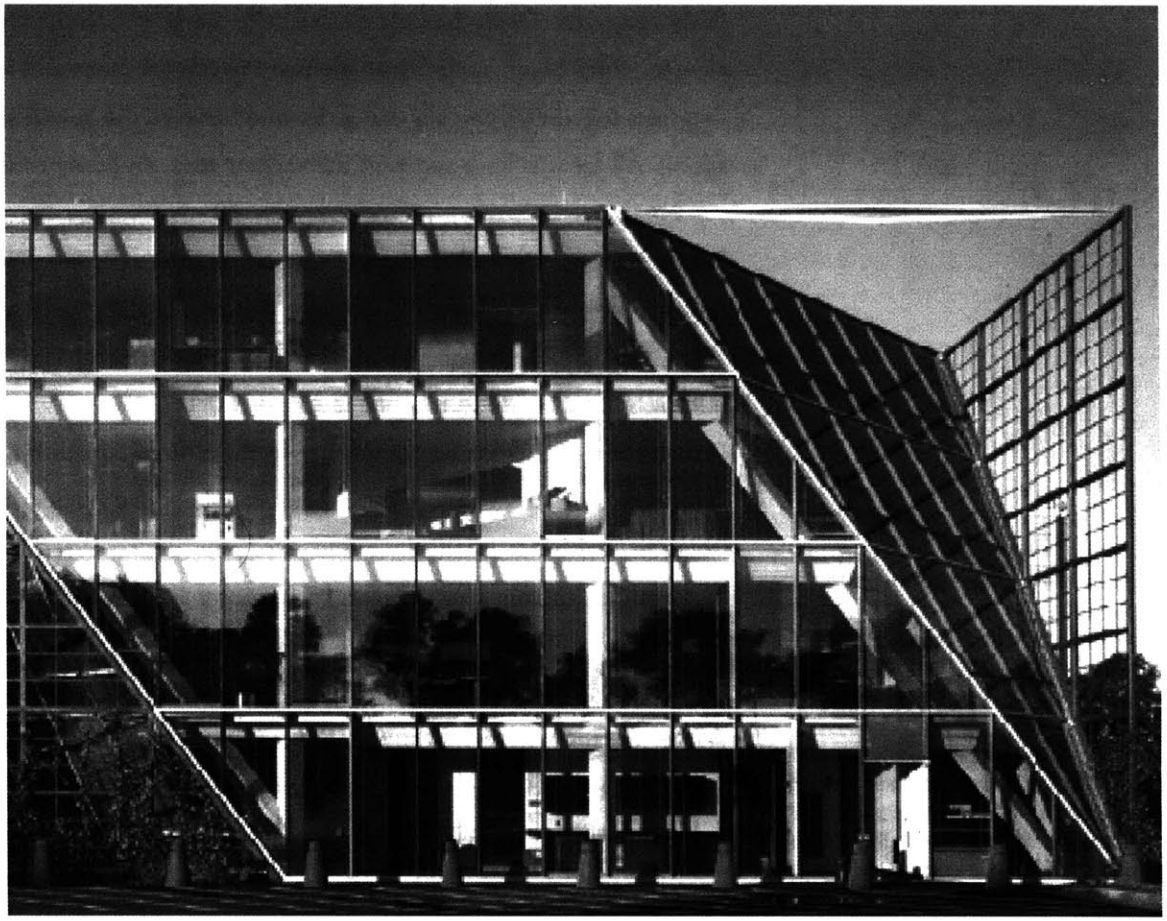

FIG. 2.7. Reedy Creek Improvement District, Buena Vista, Florida. Murphy/Jahn.

Foster who was well read, eventually found himself attracted to Le Corbusier's *Towards a New Architecture*. This was influential in his decision to pursue architecture as a career. It directly linked the technical aspect of the Parthenon to the speed and diversity offered by the modern technology of the automobile and airplane.[32] This lead to Foster getting a job with architects John Beardshaw and Partners, where Foster would copy drawings overnight in his small room above the office.[33] Eventually, he was accepted into the prestigious architecture program at Manchester University working part time to pay his tuition, and then awarded a Henry Fellowship to study at Yale with Paul Rudolph, for whom he would eventually work under as a draftsman.[34] Although Foster made friends in the United States with Richard Rogers among others, he had few and to this day Foster remains fairly introverted.

The paradox here remains that Foster designs perhaps the most socially progressive buildings, including skyscrapers. He contends in his essay "Architecture and Sustainability" that "architecture is generated by people's needs, both spiritual and material." He continues, "the quality of surroundings directly influence the quality of our lives in the workplace, home, or public urban centers."[35] The basis for sustainability for Foster therefore begins not with climatic forces or innovative engineering, rather the ever changing needs of people and their constant need for interaction not only with architecture, but with each other.

Along this line of thinking has emerged an extremely consistent set of themes and concerns that are prevalent in the firm's body of work. Using people as a basis, Foster and Partners strive to design flexible buildings that are able to accommodate change over time, anticipating through proper inquiry people's future needs.[35] Adaptability is also one of the essential tools in sustainable architecture,[36] and this also translates to their design methodology.

FIG. 2.8. Willis Faber and Dumas Building, Ipswich, England. Foster and Partners.

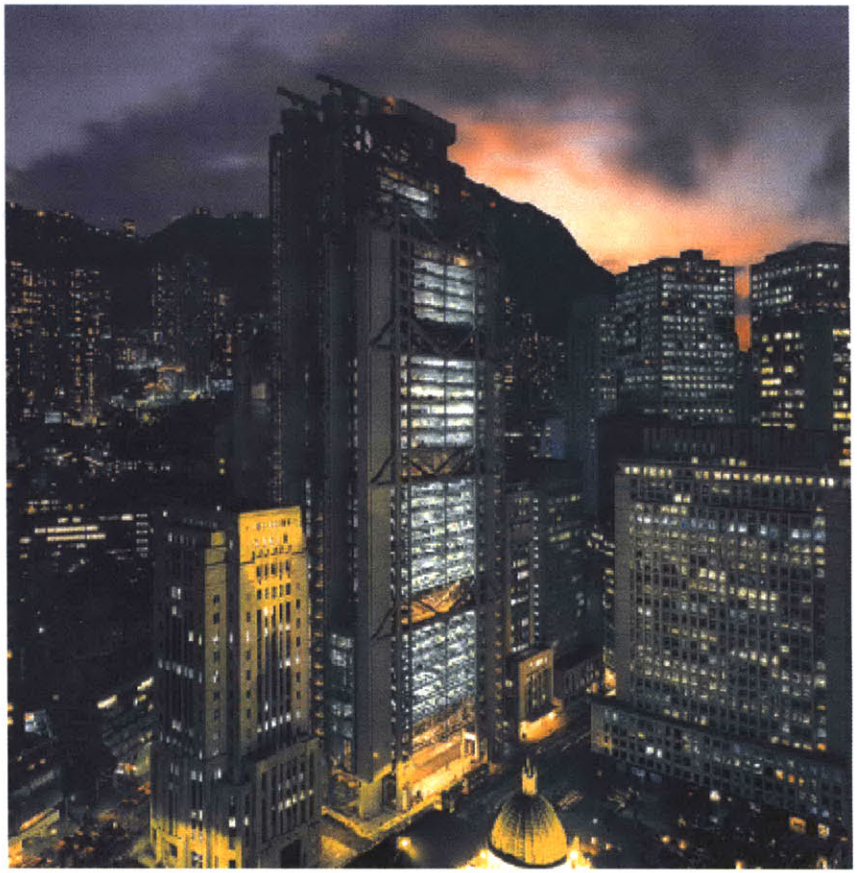

FIG. 2.9. Hong Kong and Shanghai Bank Headquarters, Hong Kong. Foster and Partners.

Malcolm Quantrill, author of *The Norman Foster Studio: Consistency through Diversity*, notes that the firm's work remains incredibly diverse despite a consistent methodology. What allows this diversity then is the manner in which the firm asks questions, seeking opportunities to invent or perhaps reinvent solutions to new or even conventional architectural problems. The firm maintains an insatiable curiosity that spans from the workings of organizations to that of mechanical systems, all of which leads up to a rigorous practice of questioning – a process that naturally extracts individual, specific solutions for various projects.[35] Through this questioning they seek design solutions that integrate social, technological, aesthetic, economic, and environmental concerns.

An manifestation of these objectives are what Foster calls 'parks in the sky,' or a series of green spaces distributed on upper levels of some of his most notable buildings beginning with the Willis Faber and Dumas (fig. 8) headquarters of 1975 in Ipswich, England. A low rise building, it illustrates quite clearly a social agenda, seeking a sense of community by using a restaurant, escalators, swimming pool, and of course roof garden in concert to bring a social dimension to the architecture.[37] In addition, the building anticipates future technological needs by using raised floors throughout the building at a time when these floors were only used for computer rooms.[36] Ironically, this building designed for change was honored with Britain's Grade 1 listed status meaning that it no longer can be changed.[37]

Challenged by the design brief to provide nothing less than "the best bank building in the world,' the Hong Kong

32. Quantrill, Malcolm. "The emergence of an architect." p. 7
33. Quantrill, Malcolm. "The emergence of an architect." p. 8
34. Quantrill, Malcolm. "The emergence of an architect." p. 9
35. Foster, Norman. "Architecture and Sustainability." p. 6
36. Foster, Norman. "Architecture and Sustainability." p. 10
37. *Foster Catalogue 2001.* p. 26

and Shanghai Bank Headquarters of 1986 originated with a questioning of banking practices in Hong Kong and how it should be expressed in built form. This line of thinking, coupled with a need to construct the building extremely quickly, resulted in a virtual reinvention of the office tower with a high degree of pre-fabrication. Fast construction translated into a need to build both upwards and downwards simultaneously, which lead to the incorporation of a superstructure.[38]

The largest project for the firm to date, many principles most notably the escalators (fig. 10) with void first floor recall identical principles to Willis Faber, not surprisingly as both projects were done within a year of each other. Large central atria increase the reading of a flow of space from one floor to the next, providing visual and spatial interaction from various floors minimizing the pancake effect.

This reinventing the skyscraper was expanded upon in the Commerzbank Tower in Frankfurt, Germany (fig. 11). Completed in 1997, Commerzbank was the world's first ecological office tower, using half the energy of a conventional tower, and at 53 stories high was tallest building in Europe, taking that title away from Jahn's Messeturm Tower also in Frankfurt.

It is clear that Foster uses an introverted design strategy in Commerzbank that is more sensitive to social issues carefully integrated with environmental concerns, than formal or gestural concerns. Sky gardens that spiral up the tower have large operable windows that allow air intake into a central void, or 'stem' of the tower. This void space has become unexpectedly more desirable for users than outside facing offices, fostering visual connectivity to other

38. *Foster Catalogue 2001.* p. 42-43

workers in the building, as well as views through the sky gardens. The gardens house various public functions such as meeting spaces and food vendors, and have resulted according to Peter Buchanan in employees visiting various atria throughout the week, succeeding in Foster's social goals.[39]

However, Buchanan in his "Reinventing the Skyscraper: Commerzbank Headquarters," attests that the tower undoubtedly succeeds in integrating social and systemic innovations, but is careful to note that the resultant tower is a mere prototype for the green or rather 'bioclimatic tower' and not a candidate as aesthetic model.[39] It is evident that the design effort was placed on exploring the social idea of the tower as opposed to searching for a skyscraper style or aesthetic. The Foster office addresses this deficiency in his most recently completed tower – Swiss Re in London.

Like Commerzbank, Swiss Re (fig. 12) expresses a desire to reconcile work and nature within the scope of an office building.[40] Swiss Re refines the social ideas in Commerzbank by continuing a smaller series six-story atria are present on every floor, and twist up the building revealing themselves on the exterior linking one floor to the other both visually and spatially.

Coupled with a form that has been attributed to an 'erotic cucumber,' the form and structure is like no other tower. The tower's distinctive shape is driven by environmental forces including optimizing wind forces for natural ventilation as well as reducing the visual impact of the building[41] The structure is a careful manipulation of economics, reducing cost by using an identical triangular facet across its entire double-curved exterior.

This project takes a radical approach technically, architecturally, socially, and spatially and is evidence of Foster's

39. Buchanan, Peter. "Reinventing the Skyscraper: Commerzbank Headquarters."
40. Foster, Norman. "Architecture and Sustainability." p. 12
41. Located on an extremely small site, the widest floor plates of the tower in fact lie in the mid-rise portion of the tower, opening up more area at ground level and allowing more daylight to reach the lower levels and surrounding buildings. The tapering of the tower is also perceived as receding therefore reducing the impact of its height to those on the ground.

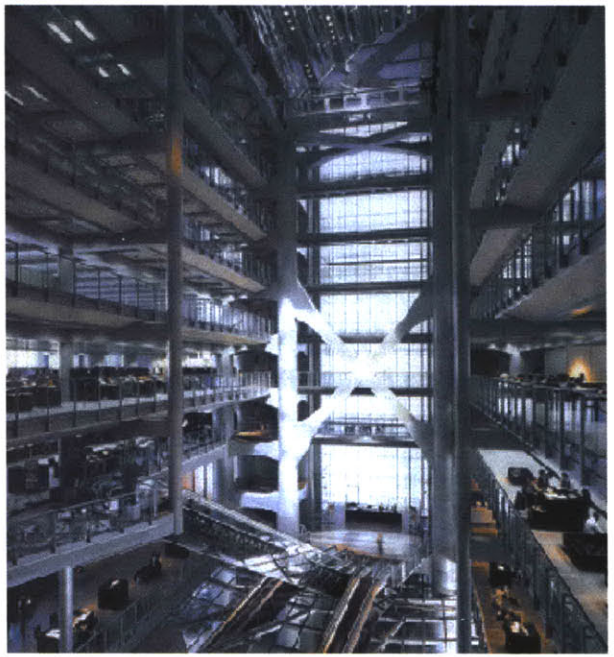

FIG. 2.10. Hong Kong and Shanghai Bank Headquarters, Hong Kong. Foster and Partners.

FIG. 2.11. Commerzbank, Frankfurt, Germany. Foster and

growing emphasis on technology and the environment, without sacrificing any social agenda. Swiss Re represents a maturity and sophistication in a line of thinking that allows an originally introverted design process to express its social innovation with an aesthetic one – truly reinventing the tower not only functionally but aesthetically as well.

YEANG, JAHN, AND FOSTER – AN ANALYSIS

What is beginning to emerge is a style fit only for the skyscraper. However, this developing 'style' lies not in a direct series of aesthetic decisions, rather in design methodologies that consider the extreme series of complexities unique to the building type. In an effort to reconcile environmental, technical, and social concerns embedded in the tall building, the result is a purely derived aesthetic based on decisions to improve function along with our relationship to the natural environment.

Yeang, Jahn, and Foster demonstrate that within the confines of a problem largely based in engineering are various ways in which to approach skyscraper architecture, and thereby preserving architecture as an art. Varying backgrounds and education influence the hands of these architects, and the three demonstrate that there is room for interpretation despite the fact that the skyscraper is increasingly evaluated more on performance than art.

Yeang is perhaps the most explicit in his search for a skyscraper style via sustainability. In an interview with Nina Rappaport, Yeang reveals that he is searching for an aesthetic, a style driven by sustainability as opposed to being entirely dictated by environmental issues. "I am searching for an ecological aesthetic, but in the final analysis, it's the building's systemic aspects that are most important"[42]

42. Rappaport, p. 175

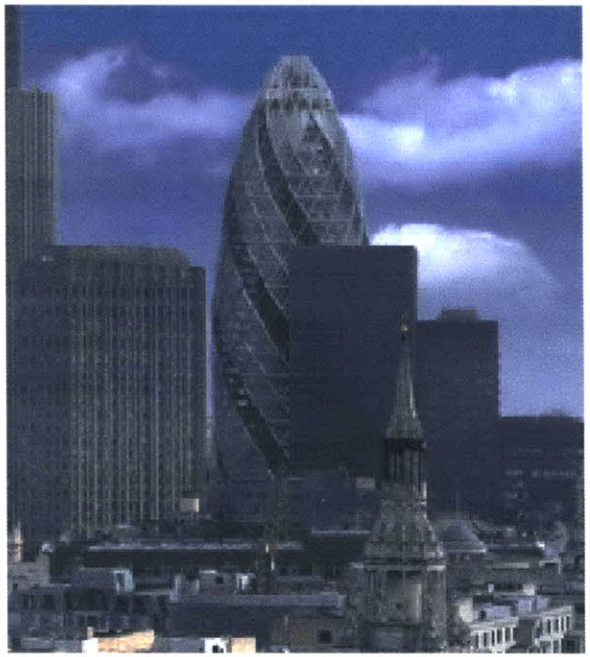

FIG. 2.12. Swiss Re Headquarters, London, England. Foster and Partners.

The problem of the skyscraper is a complex one, and Yeang is the only one who attempts unsuccessfully to answer all the questions simultaneously. Of the three, Yeang's design methodology is the least consistent, if not confusing. His desire to educate and justify sustainability and his work reveals perhaps insecurity in design. Yeang's body of work is aesthetically the most diverse as a result of his heavy hand, an effort to combat what are arguably unsuccessful endeavors in his search for a style.

His most recent projects including the EDITT Tower are chaotic at best. They are emblematic of a design methodology lacking in consistency and direction. His work is additive in nature as new problems require new solutions and technologies, each individually expressed and celebrated, as if to advertise a project's sustainability, negating relationships to each other and any attempt at integration.

Additionally, Yeang's work has been tenuously linked to a contextual, cultural response to Malaysia and the Far East. Ivor Richards, whose essay appears in Yeang's monograph, praises Yeang's work as 'integrated', and 'self-evident,' stating that the "architectural zeitgeist is resolved with technology and materials." He suggests Yeang's work is void of any Malaysian materials or traditions due to Yeang's search for a 21st century Malaysia, which is "expected to be very different from its historical origins."[43] This is seemingly more of a disclaimer than a justifiable statement.

His flamboyant architecture has resulted in few recently built works, unlike Jahn and Foster who have long surpassed him with respect to built works and refinement, seemingly with much less effort. Also known for his flamboyancy, Helmut Jahn is the only one of the three who played a major role in post-modernism, providing a concentrated

43. Richards, Ivor. "The Tropical High-Rise." p. 14

period of time in purely exploring an aesthetic. The difference between Yeang and Jahn lies in Jahn's learning from his admittedly unsuccessful post-modern days, reverting him back to his Miesian roots and principles.

Demonstrated in his Reedy Creek Improvement District building, Jahn integrated his expressive tendencies with restrained, responsible use of technology and structure. Emerging here was an extremely rational approach to his designs, resulting in work that concentrates its attention on the facade as a climatic barrier.

In the few writings Jahn has, social impact and reactions rarely are discussed, rather the technological innovations that are rooted in his collaborative work with Werner Sobek and Matthias Schuler. Jahn says "Modern buildings make the highest demands of technology. And it is not the architect who fulfills them, but the engineer."[44] What Jahn calls 'comfort-engineering,' takes into account the elements of temperature and humidity, and maximizes quality of lighting that is usually automatically modulated by sophisticated glass and facade technologies. But all of these efforts seek to establish a standard interior condition with appropriate levels of light coupled with comfortable, fresh air. Although important, what the writing and work lacks in is largely a sense of space and scale. Known for his large scale and high profile work along the lines of airports and high rises, the typologies are inherently difficult to work with in these terms. What is appreciated and emerging from Jahn's work are spaces although out of scale but meant for social interaction. Deutsche Post illustrates a progression and maturity among Jahn's work, paralleling Foster's Swiss Re in design refinement, engineering, and technology.

In stark contrast to Yeang, Foster practices a relentlessly consistent methodology, resulting in projects that are

44. Jahn, Helmut. "Architecture/Engineering." p. 11

extremely diverse. This diversity is dependent on a progression of work, [45] with every complete building serving as a prototype and precursor to the next. Unlike Jahn, Foster acknowledges the importance of 'humanity' and 'spatial quality' of a building, [46] a sensitivity that has developed as a result of his social agenda. His 'social isolation' has provided his architecture with a soft-spoken responsibility to encourage and ease social interaction, and it is this respect and sensitivity to the role of architecture that is now encompassing other aspects of skyscraper design as evidenced in Swiss Re. Foster has achieved what Yeang aspires to, in a manner which is consistent with his training and beliefs.

Jahn's Deutsche Post and Foster's Swiss Re demonstrate that concentrated design methodologies can result in beautiful architecture that encompasses the broad range of complexities presented uniquely by the skyscraper. Success here is not a result of a direct search for an aesthetic, rather a refinement of a methodology that makes the architect accountable for the social, technical, and environmental impacts of the skyscraper. The success of each skyscraper today rides not on having reached some aesthetic revelation, rather what lessons have been learned from careful synthesis of engineering and artistic desires, perhaps continuing a road to architectural perfection.

45. Time is a major component in Foster's work, designing with an understanding of some timeline and anticipation, helping a building's performance fight obsolescence. He is the only one of the three who explicitly takes time into consideration.
46. Foster, Norman. "Architecture and Sustainability." p. 6

towards a spatial unity *a spatial evolution of the skyscraper*

The evolution of the skyscraper is typically gauged by advancements in technology and height. Height relies on technology and technological development progresses more or less in a linear, chronological fashion.

In contrast, the spatial evolution of the skyscraper depends more so on the client and program. The values and needs of a community of users that client and program reflect can be influenced by contemporary trends in design. However, this does not always translate into an improved, more unified spatial quality: Mies van der Rohe's 860-880 Lake Shore Drive lacks the spatial unity of the light-courts quite commonly found in earlier Chicago skyscrapers, epitomized in the Rookery. Henceforth, the following analysis selectively evaluates attempts at achieving a spatial sense of community in the skyscraper, by tracing its non-chronological evolution.

Admittedly, many spatial 'innovations' in the skyscraper involve not much more than a hole in the floor. Seen within the context of the developer, these voids in the skyscraper come at a significant price, representing lost opportunities to generate revenue. Examples of this do exist in early skyscrapers like the Rookery as light-courts – where limited floor depths were dictated by daylight requirements. Today, spatial innovations turn towards ameliorating the primary social liability of the skyscraper: floors that have no relationship to one another and therefore provide no opportunity for social interaction such as 860-880 Lake Shore Drive. And like Foster and Partners' Commerzbank (1997), spatial innovations are many times integrated with, or justified by, a sustainable agenda.

This spatial evolution does not parallel the turn-of-the-century birth of the building type and subsequent chronological evolution, but instead found its infancy in the skyscraper's post-World War II renaissance. Fluorescent

lighting coupled with mechanical ventilation expanded floor depths, and in extreme cases such as the Sears Tower (1974), one could find himself as much as 70' away from the nearest window. [1] Paradoxically, the elevator which is arguably the most unsocial type of space, has provided the best opportunity for populations on otherwise unrelated floors to meet and interact.

In order to review the spatial evolution of the skyscraper and spanning its approximate 100 year history, we must first start with Modernism's attempt at creating a formal unity. This then progresses to a programmatic unity that borrows from various time periods, and concludes with spatial unity that fosters a sense of community that is growing in speculative prevalence today.

Return to 860-880 Lake Shore Drive (1951) in Chicago, for example, where Mies elegantly composed two singular forms that are equally divided into undifferentiated, repetitive floors completely divorced from one another. But 20 years earlier, architects Starrett and Van Vleck designed the Downtown Athletic Club (1931) in New York, and treated the entire tower as a building with only one program. Each floor had an individual purpose that was inextricably linked programmatically to other floors, unifying the entire building. Bertrand Goldberg's Marina City (1964) begins to mix programs, unifying the primarily residential complex at its base with parking and other shared functions. Bruce Graham's John Hancock Center (1971) in Chicago takes this one step further by mixing programs of office and condominiums into a single tower. The actual spatial 'innovations' begin to emerge in what may be considered non-skyscraper buildings, but share the same goal – to unify several floors with space. Frank Lloyd Wright's Larkin Building of 1906 considers not only a spatial unification but incorporates a programmatic unity as

1. Willis, Carol. *Form Follows Finance*, p. 140

well by systemically creating adjacencies of various, but compatible, programs. His Guggenheim Museum in New York of 1959 creates a vertical flow of space from one floor to the next. Today, Foster and Partners along with Ken Yeang and even of Zaha Hadid are attempting to apply these types of spatial agendas of unified space to the scale of the skyscraper. Whether or not these attempts have been successful reaches beyond the scope of this analysis, but they all collectively comprise a gradient for the spatial evolution of the skyscraper.

THE SPATIAL GRADIENT

The following is a handful of designs that tell the story of spatial evolution in the skyscraper. They are presented with respect to a 'spatial gradient,' beginning with visual and programmatic attempts at conceptual unification, and culminating with projects – many unbuilt – that foreshadow future spatial innovations in the skyscraper. Although specific criteria is difficult to articulate, the gradient presented focuses on how form, program, and/or space successfully foster a relationship and interaction between multiple floors, and promotes unity of the entire structure. The gradient begins to reveal, as evidenced by the most radical proposals occurring within the last decade, that quality, dynamic space, and an interactive experience in the skyscraper is not only important to acknowledge, but possible to achieve in making the skyscraper a true vertical neighborhood.

860-880 LAKE SHORE DRIVE

Designed by Mies van der Rohe and completed in 1951, these two elegantly composed, shear extrusions were the first contemporary 'glass' residential towers[2] (Binder, p. 8), precursors to the Seagram Building, and a prototype for the post World War II skyscraper. As mentioned earlier, at best the towers are unified by form and the homogeneity

2. Binder, George. *Sky-High Living*, p. 8

of the repetitive floor plates. Representing one polar extreme of the spatial gradient, 860-880 Lake Shore Drive is also emblematic of all the post World War II skyscrapers that emphasize form and spatial efficiency over all else. This resulted in an acknowledgment, even by Mies, that this lopsided emphasis on technology and economics didn't address the needs of a residential program within this building type. In reflecting upon his experience as a resident of 860-880, Masami Takayama writes:

> *"Mies seriously considered moving to 860 when the building was completed in 1951. But he abandoned the idea, horrified by the thought that he might have to listen everyday to complaints about the building. I think he made the right decision.*
>
> *For several years, my wife and I have lived in one of the apartments on the 24th floor of 860. From a resident's perspective, there are several shortcomings, as Mies expected. Our first unpleasant experience came on moving day. We found the freight elevator was too small, and had to abandon the idea of bringing up our 2'-8" x 8'-0" dining table. We also noticed how long we waited for the elevator (to arrive).*
>
> *Waiting for the elevator is almost always too long. If an elevator comes within one minute, we call it a miracle. This situation, of course, can be improved by increasing the elevator speed and replacing the control system.*
>
> *I have noticed, however, the elevator cab is where people meet. The occasional inconvenience gives people the opportunity to talk to each other. Some common problems even help unify the community!*
>
> *Our next experience came on a windy day. The building was swaying, water in the toilet was dancing, and the vertical blinds were swinging in pendulum motion together like a chorus line. I felt like we were on a cruise ship. A fellow resident told me (in the elevator, of course) that on windy days he makes it a habit to go to office earlier and return home later, spending more hours at the workplace which, I imagine, makes his boss happier."*[3]

3. Takayama, Masami. p. 15

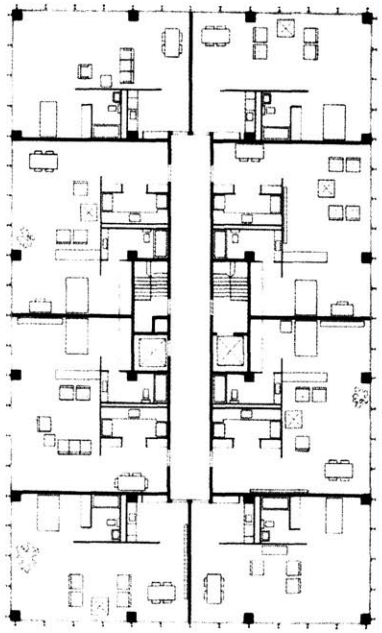

FIG. 3.1. Typical plan for 860 Lake Shore Drive - unbuilt.

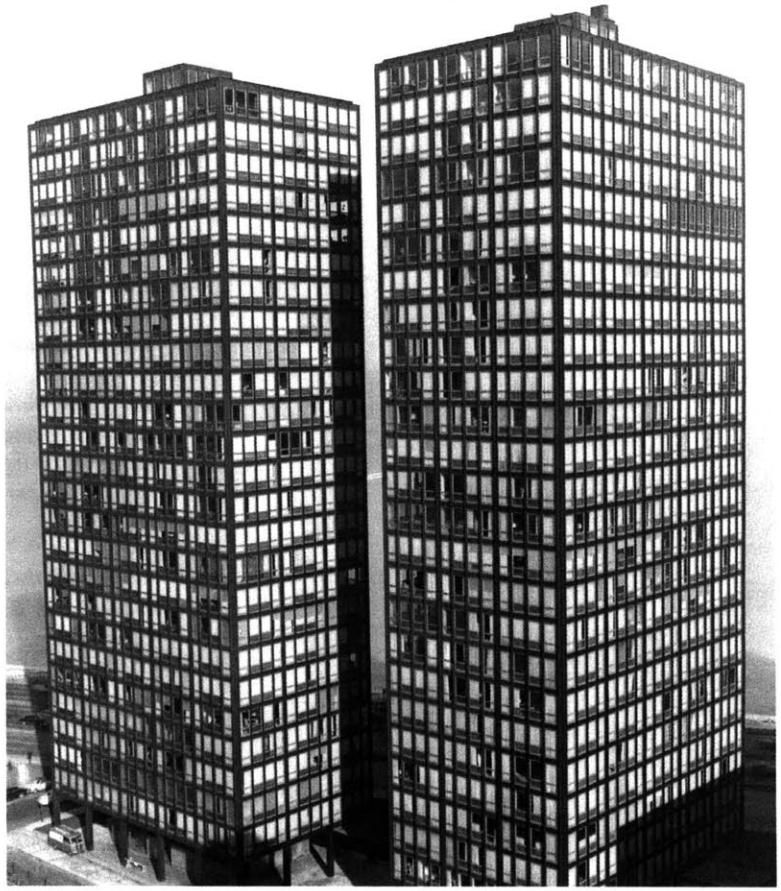

FIG. 3.2. 860-880 Lake Shore Drive. Mies van der Rohe (1951).

The elevator, as a small and isolated space, emerges as the only opportunity for populations on different floors to have any interaction, even when the elevator is inadequate. In terms of any spatial unity, the most successful aspect of 860-880 is the void between the two towers. These dual towers allow some residents to see a mirror image of the building they stand in, intuitively reminding them that their floor is only one of several that make up their 'community.'

MARINA CITY

Bertrand Goldberg's twin towered Marina City was completed in 1964, sitting across the river from Chicago's Loop. The 64-story, cylindrical residential towers use a cantilevered concrete structure, with scalloped balconies on the 40 residential floors which rest on top of 20 floors of parking. Goldberg attempts to unify the residential towers at its base formally and programmatically by using a series of varying volumetric forms to create a spatial composition. He included an amorphously shaped theater, a long, 10-story office building block, restaurant and retail space, and boat docks at river level. Most recently, many of these venues now belong to Chicago's House of Blues restaurant and hotel, and have successfully fused together programmatically as a result. However, car access to the parking garages dominates the majority of resultant spaces between forms and program, leaving the concrete-paved space uninhabitable and empty. This separates the residential part of the skyscraper from the uses that have the potential to create a neighborhood.

JOHN HANCOCK CENTER

Chicago's John Hancock Center, completed in 1970, combines living with working in a single tower. The scheme

FIG. 3.3. Price Tower, Frank Lloyd Wright (1952).

FIG. 3.4. John Hancock Center, Skidmore Owings and Merrill (1970).

FIG. 3.5. Marina City, Bertrand Goldberg (1964).

was originally intended by the developer to resemble Marina City – two (or more) towers – except that each tower would be unique programmatically. After it was realized that it was more economically sensible to build a single tower, architect Bruce Graham and engineer Fazlur Khan, both of the firm Skidmore Owings and Merrill, designed a 100-story tower that used an innovative single steel tube structure, allowing the building to be built at the cost of a conventionally supported 45-story structure.[4] The taper of the tower acknowledges the varying floor plate requirements for the two programs, placing office space at the base, and 700 condominiums on top. Chicago Tribune architecture critic Blair Kamin superficially calls the Hancock Center a 'vertical village,' despite the fact that both programs are divided at the 44th floor with a pool and supermarket.[5] The tallest mixed-use project in the world at its completion, its apartments reaching the 92nd floor remain to this day the highest ever built. Within the context of the spatial gradient, the John Hancock Center represents the first step towards unifying the tower programmatically and formally, regardless of its two programs working independently of each other, and lack of interaction between multiple floors.

PRICE TOWER

Frank Lloyd Wright's Price Tower in Bartlesville, Oklahoma, was completed in 1952. At its completion, the 19-story cantilevered concrete structure is one of a few examples of a tall building having mixed-use floors, with a 25% residential and 75% commercial distribution on almost every floor.[6] Here, the program takes the mixed use concept of the John Hancock one step further by integrating multiple uses within a single floor, while the divorce from floor to floor still remains.

4. Kamin, Blair. Why Architecture Matters, p. 103
5. Kamin, Blair. Why Architecture Matters, p. 102-103
6. Binder, George. p. 8

FIG. 3.6. Downtown Athletic Club, New York, Starrett and Van Vleck (1931).

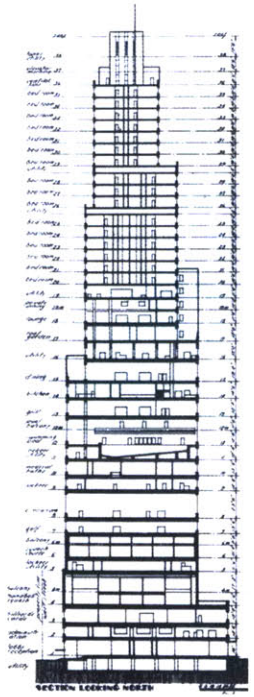

FIG. 3.7. Downtown Athletic Club section

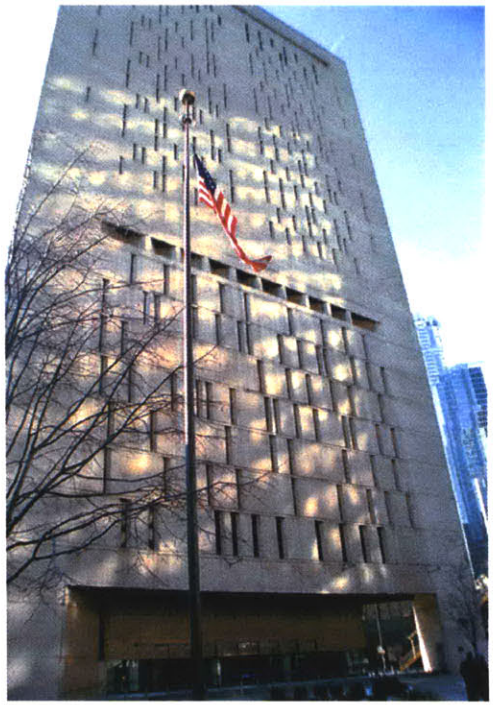

FIG. 3.8. United States Courthouse Annex, Harry Weese (1973).

THE DOWNTOWN ATHLETIC CLUB

Designed by architects Starrett and Van Vleck, with associate architect Duncan Hunter, the Downtown Athletic Club was completed in 1931. Standing in New York at 38 stories and 534 feet, Rem Koolhaas notes that the tower, as an athletic facility, places the physical and social human body at the center of the architecture. "The Skyscraper is used as a Constructivist Social Condenser: a machine to generate and intensify desirable forms of human intercourse."[7] The Downtown Athletic Club is seemingly the first skyscraper that has a program in its entirety that creates a floor-to-floor dependency by distributing spaces that are supportive of each other such as locker rooms, a golf course, weight room, and others, all on their own floors. This programmatic flow begins to link floors socially, creating a unity or bond between people, and the society they comprise.

UNITED STATES COURTHOUSE ANNEX (CHICAGO METROPOLITAN CORRECTIONAL CENTER)

Architect Harry Weese designs continues this example of floor-to-floor dependency in another programmatically unique tower – the United States Courthouse Annex. The 27-story triangular jail on the corner of Clark and Van Buren streets in Chicago was completed in 1973. The concrete structure with only narrow, vertical slits for windows is in direct contrast to the curtainwall system so popular with its contemporaries. Despite its unique appearance, which is obviously a direct result of its unique program requirements, the jail combines 13 lower floors of administrative, medical, and other support facilities, two floors above that with cells for pre-trial inmates, and at the top a series of double-deck floors that house the regular prison cells of various classifications.[8] The vertical jail not only combines form and program like the Downtown Athletic Club, but with its double-decked prison cell floors, it begins to spatially unify the tower. This unity is desirable for the rather unorthodox program of a jail by minimizing the resources needed for surveillance of its residents.

7. Koolhaas, Rem. *Delirious New York.* p. 152
8. Douglas, George. *Skyscrapers: A Social History* p. 203

FIG. 3.9. MBf Tower. Ken Yeang (1993).

FIG. 3.10. The Rookery, light-court.

FIG. 3.11. The Rookery, John Wellborn Root (1888).

THE ROOKERY

Designed by John Wellborn Root in 1888, the expressive exterior structure of the Rookery reveals nothing of its famous central light-court. The lobby with its glass roof was restored in 1992 to reflect Frank Lloyd Wright's 1907 renovation[9], is flooded with natural light through the void of the light-court above. Aside from the tenuous glass lobby roof, the glass enclosed light-court creates a single space that each floor of the building has direct access to, creating a quiet and intimate sense of community among varying tenants.

MBf TOWER

An early manifestation of his 'places-in-the-sky' dictum, Ken Yeang's MBf Tower in Penang, Malaysia was completed in 1993 and stands at 365 feet tall with 31 stories of residential and office space. A key feature in this mixed-use tower is the series of two-story 'skycourts' that punctuate the mid and high rise portion of the tower. These public spaces in the sky are intended not only to accommodate social interaction, but provide improved natural ventilation and space for plants and terraces. The MBf Tower uses double-height spaces to create communities among only small portions of the tower. To this end, MBf Tower can be considered as a precursor to Yeang's future proposals, which grow increasingly radical in combining spatial unity (and vertical urban design) of the tower as a whole, coupled with a sustainable agenda.

ZENTRALE DEUTSCHE POST

In what architect Helmut Jahn claims is his firm's most defining skyscraper to date[10], Zentrale Deutsche Post maximizes material efficiency and practices cutting edge technology in glass with its double-glazed facade, and

9. Pridmore, Jay. *The Rookery*, p. 39

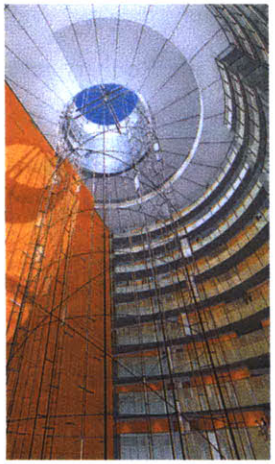

FIG. 3.12. Kowloon Station Tower interior.

FIG. 3.13. Kowloon Station Tower interior

FIG. 3.14. Kowloon Station Tower. Kohn Pedersen Fox (2008).

FIG. 3.15. Zentrale Deutsche Post, Murphy/Jahn (2002).

computer controlled climate and shading devices. The delicate quality of glass is also used in the floors of each of the 4 dramatic 10-story high atria. Stacked one upon the other, this naturally ventilated central void is sandwiched between a split core and two elliptical forms that collectively form a single tower. Glass bridges connect the two cores at each level, allowing the upper floors of the atria to aid in natural air distribution. Although only a single tenant occupies the building in Bonn, Germany, the tower could effortlessly be converted to a multi-tenant use in the future, with the atria acting as an effective way of promoting social interaction. However, the corridor-like atria offer little visual continuity to the rest of the offices since it is sandwiched between cores. Time will tell if the glass bridges are enough to sustain any type of activity within these spaces, void both spatially and programmatically.

JIN MAO TOWER

In the quickly developing Pudong District of Shanghai stands the Jin Mao Tower by Skidmore Owings and Merrill, completed in 1999. The mixed-use program incorporates in the 88-stories office, retail, and a Grand Hyatt Hotel. Unifying the hotel is a 38-story spiraling void, surrounded by corridors leading to one of 555 guest rooms. [11] As dramatic and progressive as this void seems to be, at issue is any visual connectivity to those who share the atrium. However, it must be acknowledged here that the hotel program doesn't lend itself well to a socially diverse and active space, which would most likely be undesirable in this circumstance.

KOWLOON STATION TOWER

Kohn Pedersen Fox's Kowloon Station Tower in Hong Kong is will be one of the world's tallest buildings when completed in 2008. The tower features a mixed-use program with offices crowned by a 300-room boutique hotel,

10. Jahn, Helmut. "Architecture Engineering," p. 158
11. www.som.com

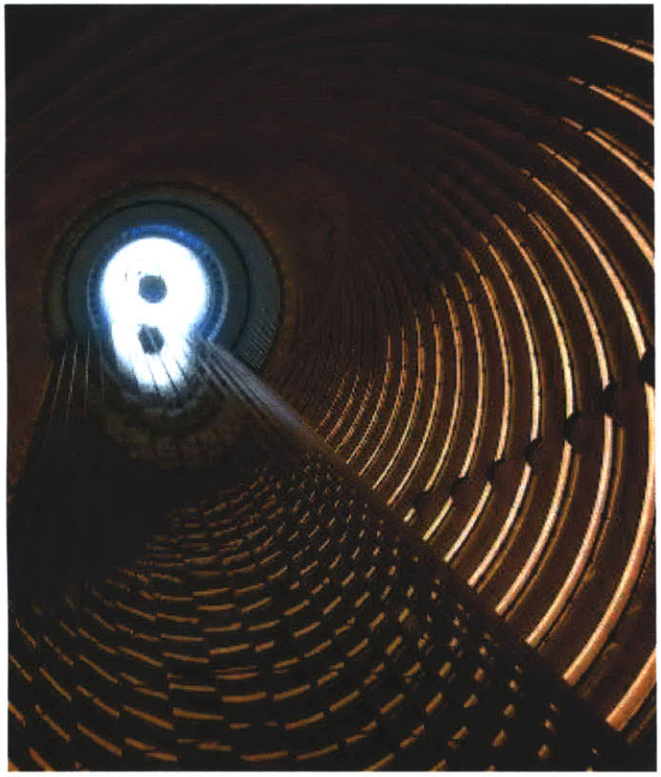

FIG. 3.16. Jin Mao Building hotel interior.

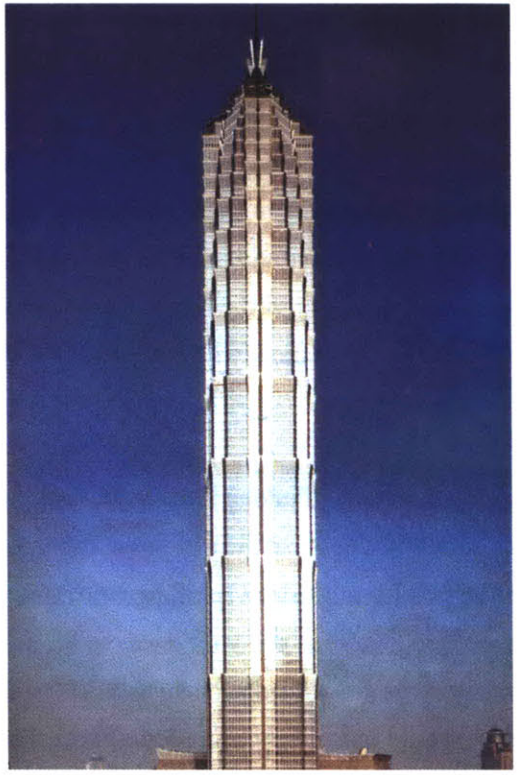

FIG. 3.17. Jin Mao Building. Skidmore Owings and Merrill

FIG. 3.18. Railway Exchange Building, Daniel Burnham and Company (1904).

and further paralleling SOM's Jin Mao Tower, a central void unifies the hotel floors at the top. Much smaller in scale at only 13 stories, the atrium capped by a restaurant promises to be more appropriate in scale to users than Jin Mao.[12]

Both the Jin Mao Tower and the Kowloon Station Tower succeed in creating a dramatic spatial unity between multiple floors, which is appropriate for the program requirements of a hotel. However, both also illustrate that without specifically designating spaces to create a programmatic dependency from one floor to the next, these voids will operate quite similarly to conventional high-rises.

RAILWAY EXCHANGE BUILDING

Sometimes referred to as the Santa Fe Building, this 17-story building designed in 1904[13] by Daniel Burnham and Company has been home to some of Chicago's most significant architects. Daniel Burnham and Company had their offices on the 17th floor, which is currently occupied by Lohan Caprile Goettsch Architects, at one point known as the Office of Mies van der Rohe. SOM also has their Chicago headquarters there, along with VOA Associates and the Chicago Architectural Foundation. Aside from an impressive tenant list, the building has at its center a renovated light court. Unlike the Rookery, however, the renovation by another former tenant – architect Helmut Jahn with then C.F. Murphy Associates – placed a new skylight at the top of the light court and completely opened up all floors into the central space. Despite the open air quality, noise levels remain surprisingly quiet and small corridors that ring the light court at each floor are narrow enough to allow visual connectivity from one floor to another. Perhaps with the help of a common profession, one can actually begin to feel a sense of community within

12. Luna, Ian. *KPF: Architecture and Urbanism*, p. 474-483
13. Mayer and Wade. p. 218

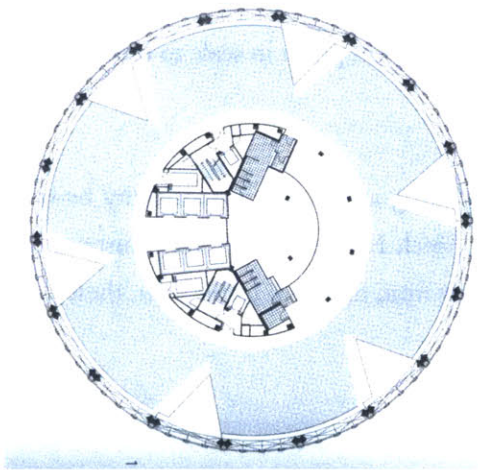

FIG. 3.19. Plan - Swiss Re. Foster and Partners.

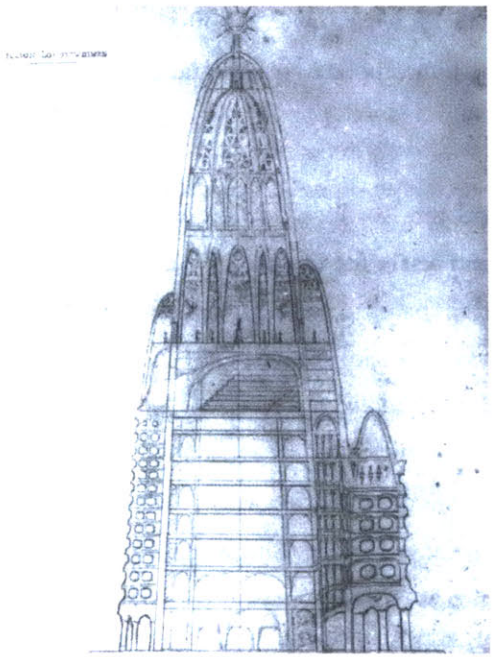

FIG. 3.20. Grand Hotel, Gaudi (1908).

FIG. 3.21. Swiss Re. Foster and Partners (2004).

FIG. 3.22. Commerzbank, Foster and Partners (1997)

the building, suggesting a vertical neighborhood that uses a similar culture or activity that helps to define an identity for this community.

SWISS RE

Swiss Re in London, completed in 2004 and designed by Foster and Partners, features a distinct form, reminiscent of Antonio Gaudi's 1908 proposal for the Grand Hotel in Manhattan.[14] The cylindrical, 'cucumber-like' form is created by a circular plan, with six triangular voids cut out creating a 'pin-wheel.' These floors that are widest at mid-rise and taper at the high and low rises, are slightly twisted at each of the 41 floors creating the spiraling 'gardens-in-the-sky.' Characteristic of Foster and Partners, this innovation serves users socially and environmentally, by spatially breaking down the scale of the tower, and generating the necessary pressure differential required to aid the flow of natural ventilation.

COMMERZBANK

One of the world's first eco-towers second to the RWE Tower in Essen, Germany, Commerzbank in Frankfurt, Germany, was completed in 1997. The 57-story tower is once again a manifestation of the integrated social and environmental agendas that characterize its architect – Foster and Partners. Never widely acclaimed for its appearance, Kamin admits that Commerzbank is "in short, more important as an idea than as a building."[15] The tower is triangular in plan, with a hollow void in the center to aid stack effect ventilation. Air is fed into the void through large, planted atria that progressively step up the tower. Although the ecological benefits the building originally promised have been brought into question, James S. Russell in his essay, "Form Follows Fad: the troubled

14. Koolhaas, Rem. p. 105

FIG. 3.23. Larkin Building, Frank Lloyd Wright (1906).

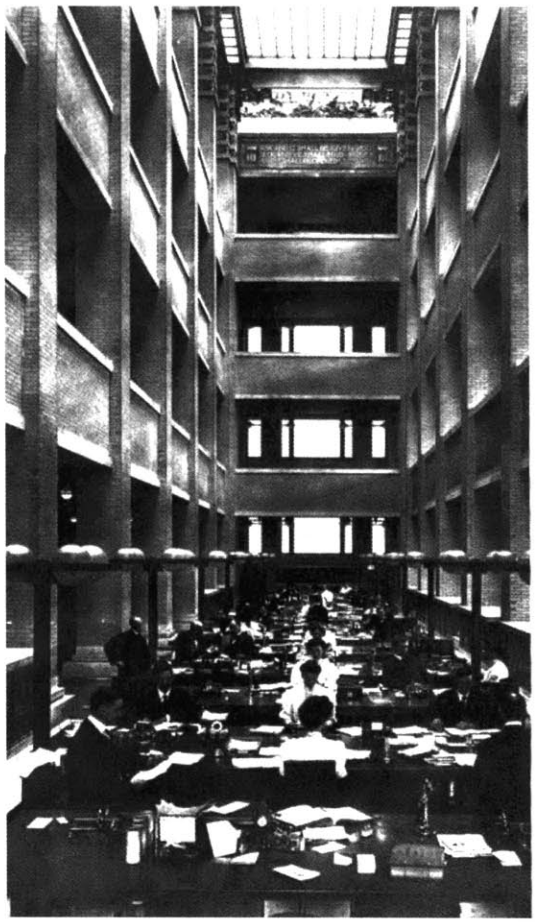

FIG. 3.24. Larkin Building interior.

love affair of architectural style and management ideal," the atria have become largely successful in accomplishing Foster's social goals of bringing users together:

> *"It not only gave all the office an outside window, it transformed the entire experience of working in a tall building. Most [conventional] tower occupants have a sense of themselves as individuals because they look out over a skyline of strangers and competitors. There is little connection with colleagues who work on other floors. At Commerzbank, occupants of atrium-facing offices not only see the sky through the garden openings, they see colleagues at work on floors above and below. Individuals are palpably reminded that they are a part of a larger organization. The gardens, shared by several floors, make readily accessed meeting places"*[16]

An obvious precursor to Foster's more refined Swiss Re, Commerzbank is an experiment in environmental responsiveness, and relative to Mies' 860-880 Lake Shore Drive, represents a model for fostering community in the skyscraper.

LARKIN BUILDING

The Larkin Building in Buffalo, New York was perhaps a leading example of integrating program and spatial volumes to foster social and spatial unity. Designed by Frank Lloyd Wright and completed in 1906, the Larkin Building at 5 stories tall may not necessarily be considered a skyscraper by definition; however, its integration of multiple floors and program must be acknowledged. The Larkin Company sold household products by mail-order, and as a result of the Industrial Betterment Movement, which proclaimed that the happiness of employees was directly related to productivity, the company treated its employees like family. In addition to picnics and concerts,

15. Kamin, Blair. Why Architecture Matters, p. 119
16. Russell, James. "Form Follows Fad," p. 65

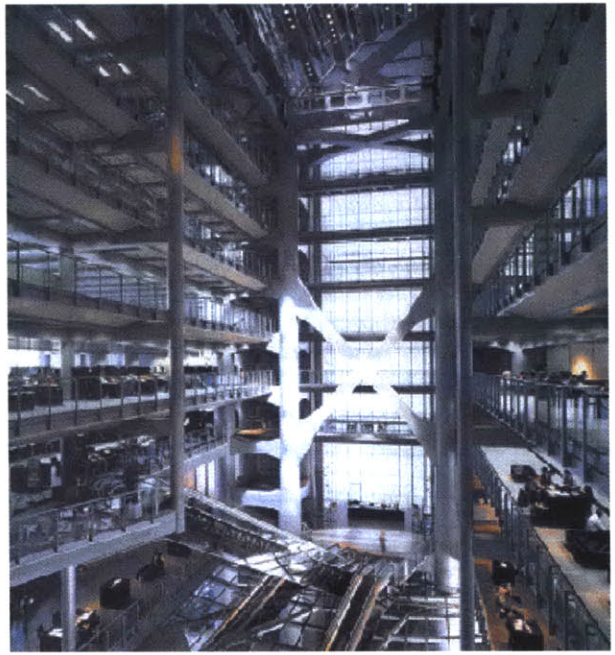

FIG. 3.25. Hong Kong and Shanghai Bank Headquarters interior.

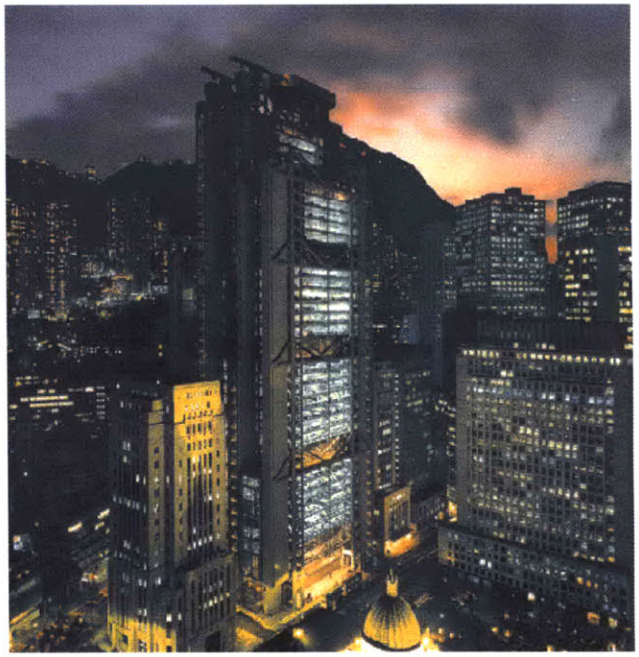

FIG. 3.26. Hong Kong and Shanghai Bank Headquarters, Hong Kong. Foster and Partners (1986).

Larkin provided incentives for education and profit-sharing. Wright's role in the success of the Larkin Company was to design a building to house the growing clerical staff required by the mail-order business. He designed the building as an efficient machine for processing mail: orders were collected at the ground floor and moved to the upper levels, and would then be processed downwards around a central atrium space that was filled with natural light. Throughout the central atrium and public areas were inscriptions that read of such phrases as "Intelligence, Enthusiasm, Control" and the most emblematic of the Larkin Company – "Ask and it shall be given to you. Seek and ye shall find. Knock and it shall be opened unto you." [17] The Larkin Building, as Russell writes, was one of the "most conceptually and technically rich commercial buildings of the twentieth century."[18]

HONG KONG AND SHANGHAI BANK HEADQUARTERS

Foster and Partners' Hong Kong and Shanghai Bank Headquarters predates Commerzbank by 11 years. Completed in 1986, it is comprised of three towers of 29, 36 and 44 stories. A single, 10-story atrium separated from a ground floor that is open to the outdoors and the public[19], implies a direct link between the bank and the city. Escalators that penetrate a glass 'under-belly' suggest a flow of space from the city street seamlessly into the building. The atrium offers a visual and physical connection between individuals inside and outside the building.

SUYOUNG BAY LANDMARK TOWER 88

Intended to be a focal point for the Daewoo Marina City master plan in Pusan, South Korea, the Suyoung Bay Landmark Tower was designed in 1998 by KPF. The 102-story tower incorporates offices, hotel, and apartments into the sail-like form.[20] At the office levels, every floor is paired by a double height, triangular shaped atrium

17. Russell, James. p. 53
18. Russell, James. p. 50
19. *Foster Catalogue 2001*, p. 42
20. Luna, Ian. p. 254-265

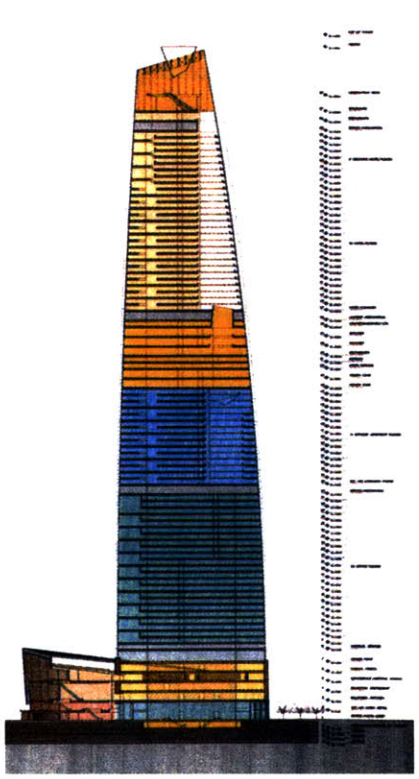

FIG. 3.27. Suyoung Bay Tower 88 section.

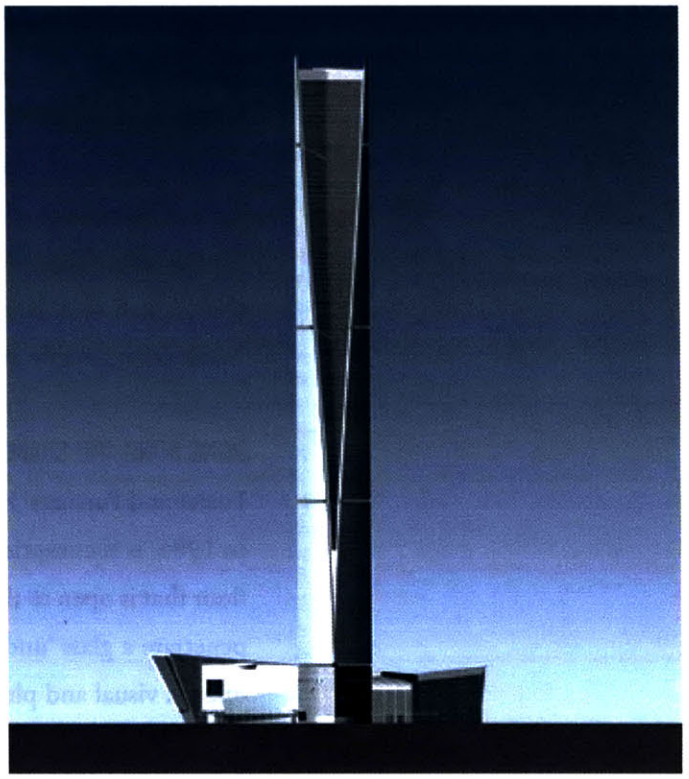

FIG. 3.28. Suyoung Bay Tower 88. Kohn Pedersen Fox.

space. Within the hotel and apartment portions of the tower, are two sets of atria: a large, continuous atrium on the northeast portion of the structure opens up residences and guest rooms to views of the city, whereas smaller, two-story high atrium spaces on the southwest side of the core provides a much more intimate space for gathering and interaction. Every floor has access to a 2-story atrium space, and all residential program share another series of 6, 12, or 18 story atria.

SHINAGAWA MIXED-USE DEVELOPMENT

Foster and Partners proposed the 28-story Shinagawa Mixed-Use Development for Tokyo in 1990, integrating a residential program into an office building, allowing the additional 25% increase in floor area that made the project economically viable. Formally, a radio antenna is placed on top of a 28-story service and circulation core, while floors are terraced up to the top of the tower covered by an arcing metal louvered roof. Like Wright's Price Tower, office and residential programs share each floor, with residential program and terraces making up the stepped portion of the tower, and offices set beneath. The entire complex sits on top of a 3-story retail base.

GUGGENHEIM MUSEUM

Completed in 1959, Frank Lloyd Wright's Guggenheim Museum in New York uses a spiraling ramp to not only define a unique space, but create a continuous, flowing link from one floor to the next. Although sometimes criticized for placing visitors in an awkward viewing position, the art subconsciously draws visitors up the ramp,

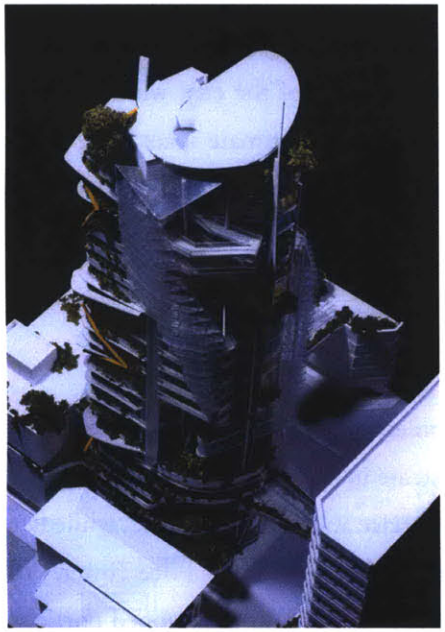

FIG. 3.31. EDITT Tower, Ken Yeang (1997).

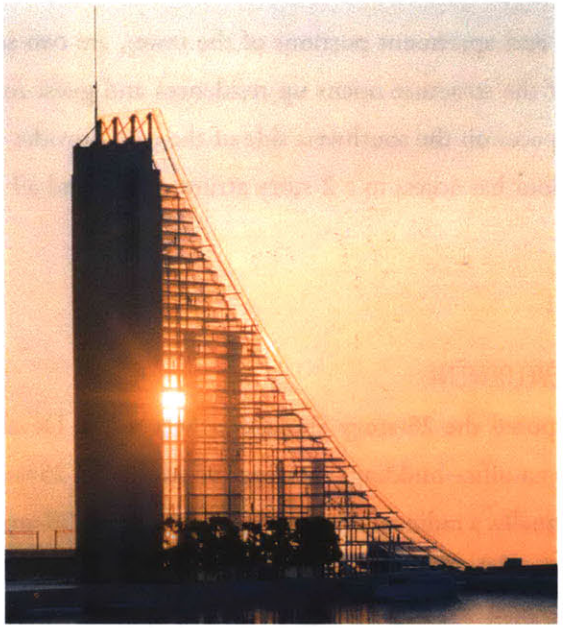

FIG. 3.32. Shinagawa Mixed-Use Project. Foster and Partners

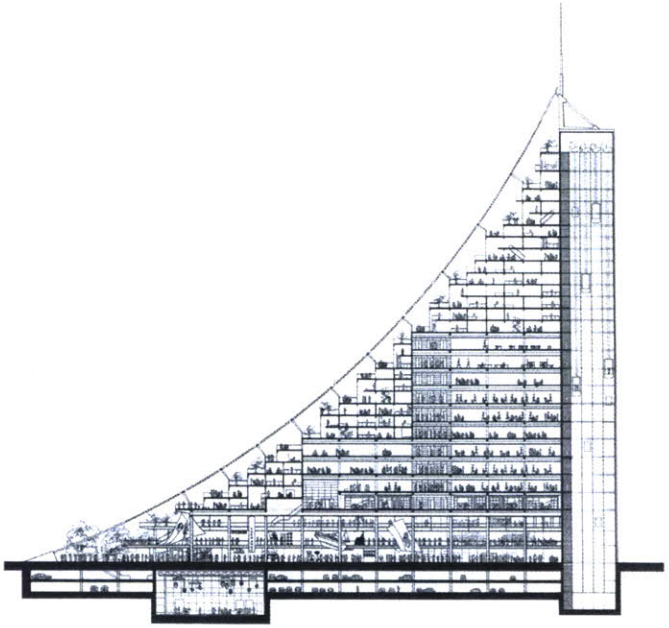

FIG. 3.33. Shinagawa Mixed-Use Project section.

pulling them into the museum's galleries, or guiding them down. The physical act of walking up a long ramp is interrupted by visual distractions and pauses, ensuring that the space is always active.

EDITT TOWER

The EDITT Tower designed in 1997 by Ken Yeang is emblematic of his developing innovations in skyscraper design, viewing the tower more as the vertical urban design of an ecological system. He uses a series of twisting public spaces covered in vegetation that appear to organically 'grow' up inside the tower, shifting volumes aside in order to open up the central void to light and air. The tower tends to have a subtractive language, as the public spaces and vegetation appear to eat away at what was otherwise a conventional high-rise. Screens are applied to aid in natural ventilation and sunshading.

42ND STREET HOTEL

Zaha Hadid's 1995 proposal for the 42nd Street Hotel in New York represents the polar opposite of Mies's 860-880 Lake Shore Drive within this spatial gradient. At 45 stories, the 950 room hotel is conceived by Hadid as a 'vertical street,' manifested by a 'tower of towers,' one stacked upon the other. A central void is created by this additive collage of towers forming the space of the 'vertical street,' which is linked to the city by a 3-story retail podium and a subway station below. Varying facades, differentiating the towers from each other within the void and the exterior as well, loosely conform to the shape of a rectangular extrusion. [21] Despite a singularly programmed tower, the flow of space characteristic to Hadid's work, links the hotel tower seamlessly with the retail base, and the base to the city.

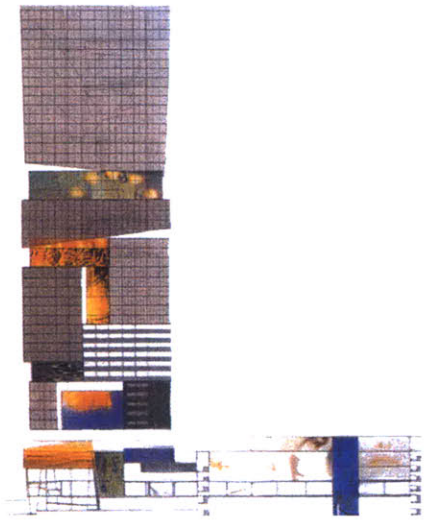

FIG 3.34. Section - 42nd Street Hotel. Zaha Hadid

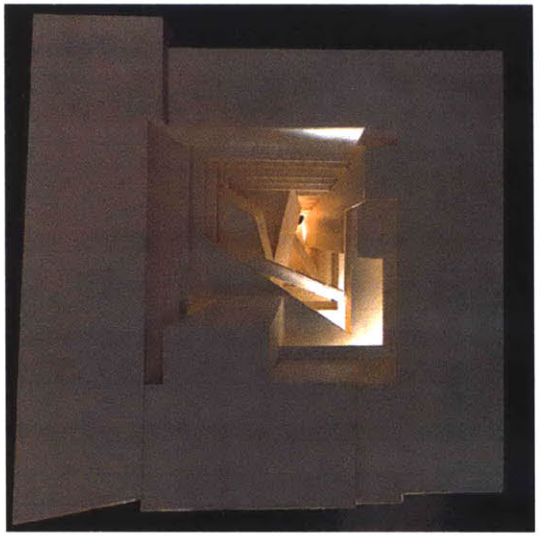

FIG. 3.35. Looking up 'vertical street' (central void).

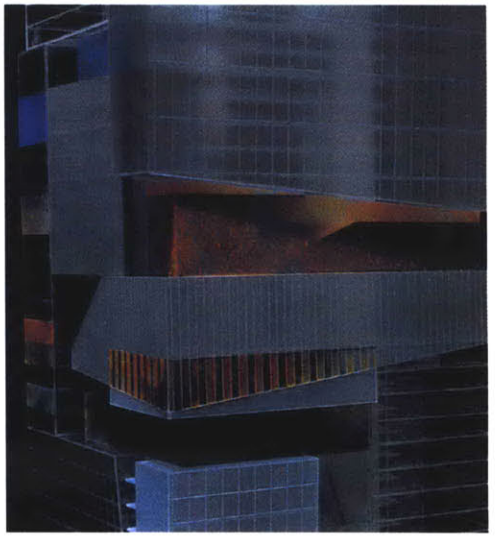

FIG. 3.36. Mid-rise facade model. 42nd Street Hotel. Zaha Hadid (1995).

Yeang and Hadid's work hint at the next steps for spatial innovation of the skyscraper. Both view the skyscraper as vertical extension of the city, and suggest a programmatic unity and dependency not only within the skyscraper itself, but also to the city as a whole.

Despite differences in chronology, architect, program, or location, it is interesting to note that the majority of these spatial innovations are reserved for only the occupants of the respective skyscraper. George Douglas remarks about the United States Courthouse Annex: "Some 4,000 penologists from all over the world have visited this $10 million building, and most have raved about the facilities. Alas, the general public is not invited inside."[22] Although a vertical prison is unique in its need for protection, security, and surveillance, skyscrapers that have vast public and open spaces are treated no differently and are closed off from the city.

In order for the spatial evolution of the skyscraper to progress and to reach its maximum potential, the skyscraper's spaces need to be opened up to the public, and therefore, to the city. In the post-September 11th questioning of the security and validity of the skyscraper, this seems to be an impossible feat. However, if innovations in the spatial system of the skyscraper can start taking priority in design and begin to dictate a reconsideration of other systems such as the structural and environmental systems, indeed the skyscraper may be finding its way to yet another, experientially richer renaissance.

21. *Zaha Hadid: The Complete Works*, p. 106-109
22. Douglas, George. p. 203

FIG. 3.29. Guggenheim Museum interior.

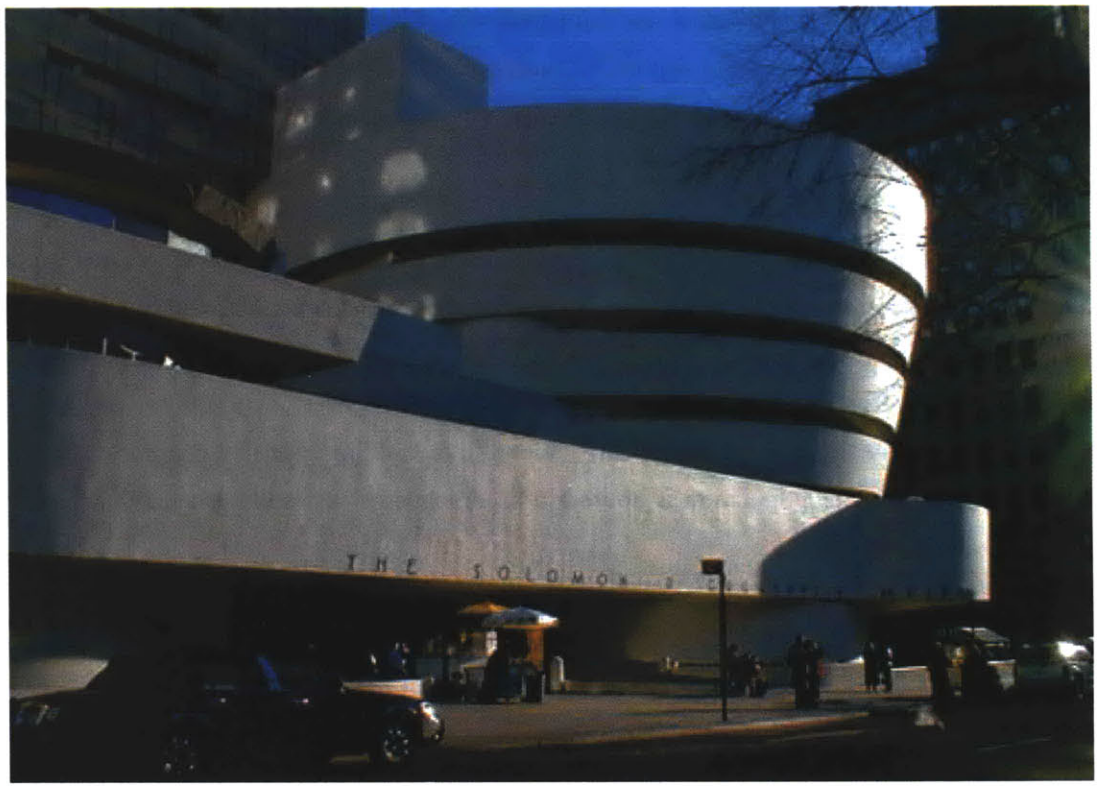

FIG. 3.30. Guggenheim Museum, Frank Lloyd Wright (1959).

the residential tower oxymoron

The residential tower has population and land areas that approach those of small city neighborhoods, yet lack any of the qualities and characteristics that define successful neighborhoods and the communities that comprise them. Therefore, it was quite natural to select a residential program as a focus of this thesis because the residential tower exacerbates the social problem of the skyscraper.

The residential tower shares many of the same set of problems that office towers epitomize, including perhaps one of the primary problems of the building type: economics drives design decisions and values money, and not the values of quality space and community. What follows is a brief description of some of the problems more specific to the residential tower. As it stands today, the concept of a "residential tower" is currently an oxymoron: the neighborhood which requires diversity as a key ingredient is housed in a building type that is notoriously homogenous. In other words, a heterogeneous population is housed in a homogenous series of spaces, from floor to floor, building to building, and city to city.

Additionally, despite vast functional differences, residential towers are only slight modification of their office tower ancestors, superficially domesticated using brick veneers and gable roofs. Residential towers naturally differentiate themselves from office towers by what I call a texture or grain that emerges on facades. 860-880 Lake Shore Drive is perhaps the best example where the variety of window shades dominates the appearance of the tower creating a visual cacophony that isn't found in office towers. Small balconies also hint at a residential tower like Bertrand Goldberg's Marina City in Chicago, which have been nicknamed the "corncobs" after its cylindrical towers that are covered in scalloped balconies creating the appearance of corn kernels. Although the balconies dominate the appearance of

FIG. 4.1. Chicago residential towers.

Marina City, in most cases balconies appear as 'tacked on after-thoughts' and are grossly undersized and are therefore uninhabitable.

However, appearance does not account for the lack of public spaces and opportunities for social interaction. People can live within close proximity to each other, sharing the same floor or group of floors for years, even decades, and still never know their neighbors who live only feet away.

And perhaps this is an advantage to skyscraper living and even urban living – a certain amount of privacy is expected as in any living condition, however it is understood that the vast majority of high-rise housing stock, if not all of it, provide this lack of community for those who seek it.

As the majority of high-rise housing stock stands, the opportunities for social interaction are limited to the corridor and the elevator. These spaces, however, are arguably the spaces that are the most prohibitive of social interaction.

The corridor is empty, wide enough only to meet code requirements, and completely enclosed relying on artificial light all the time, and on signage to provide users orientation. From tower to tower, the corridor varies little, and the opaque walls reveal nothing of the quality of space beyond, or the people who inhabit those spaces. Additionally, some residential towers have as few as 3 or 4 units per floor, practically guaranteeing that residents will rarely bump into each other even though they share the same floor.

These floors divorced from one another are reconciled via a tenuous connection by the elevator. Standard elevator cabs that travel up dark concrete shafts coupled with what I call "elevator etiquette" usually translates into complete silence in the ride, even with sometimes a dozen or so people inhabiting the same small space. It seems that all social activity ends when people step into an elevator cab – conversations end or are at least whispered out of respect for other occupants, and cell phone discussions die thanks to a lack of signals. Additionally, it is natural for people to inhabit distant corners of the cab, placing as much space between each other as possible.

Connecting the corridor and the elevator are elevator lobbies. In many cases, these lobbies like corridors, are exactly the same from one floor to another, forcing elevator occupants to rely on the number on the door jamb of the elevator to give a sense of orientation. These elevator lobbies in an effort to minimize circulation space and therefore limit the loss in revenue, become corridor-like spaces that signal to users that it is intended for people to pass-through rather than celebrate the act of waiting for the elevator; this is currently the skyscraper's best option in creating any real sense of community.

To be able to identify oneself with a community or neighborhood is healthy human nature. There is no reason why residents must leave their home to find community elsewhere in the city, or move to the suburbs in search of a better way of living. The skyscraper will only continue to grow in importance as populations grow and land areas in metropolitan areas become scarcer, and in the end, there may be very little room left in cities to help foster the very communities that the residential tower prototype of today deny.

definitions *the skyscraper and the neighborhood*

This thesis was carefully titled "The Living Skyscraper: Mapping the Vertical Neighborhood." It is important to first define these conventional terms before discussing the significance of the word, "living."

Yet another way the skyscraper building type is unique is in its rather poetic title – few other building types lay claim to such a promising and perhaps somewhat intimidating name. The term "skyscraper" is many times interchanged quite freely with "high-rise" and "tall building" however these two sets of terms with emphasis on "skyscraper" have been used throughout this thesis quite purposefully.

"Tall building" and "high-rise" are quite similar, if not entirely synonymous. For me, "tall building" is a very relative term, relying on its context within the city and its surrounding buildings, and in the case of this thesis, on the surrounding topic of discussion. "High-rise" is a bit more definitive to me, as the verb "rise" is limited only by the preceding ambiguous word "high." It begins to evoke an emotional response, but not as successfully as the term "skyscraper."

"Skyscraper" implies a relationship with the sky, as well as the implied relationship with the earth. William Pedersen put quite eloquently his definition of "skyscraper" in the preface for Eric Höweler's book *Skyscraper: Vertical Now*:

> *"Throughout the world all major cities are now dominated by the tall building. However, only a relatively small percentage of these tall buildings can indeed call themselves 'skyscrapers.' Absolute height is not in itself a determinant or a qualification of the term. A proportional relationship of height to width, pointing to the very slender, is a more useful indicator. Even this is not a guarantee. Rather, for me, a skyscraper is defined by an aspiration, one that intends to link earth and sky. Therefore, by this definition,*

a relatively short building, such as the Woolworth Building, is a skyscraper. To my eyes, Hong Kong has more skyscrapers than New York. I view central Hong Kong almost as a fertile valley surrounded by mountains. The tall buildings appear to be growing like plan material from the forest floor, each striving like mad for the light and sky." [1]

This 'aspiration' to link earth and sky results in building a vertical bridge, using the body of the skyscraper to combine the resources of the sky with the earth, or more specifically the city, below. Inhabiting space in the skyscraper high above the city is quite different than neighboring "tall buildings" or "high-rises" that participate in forming canyons that shape our cities' streets.

Another set of terms that are used quite interchangeably are "community" and "neighborhood." Although they are close cousins, there does lie a distinction. "Community" is defined more by shared culture and method of social interaction among a group of people without any indication of location: several online communities exist in the form of chat rooms and networks of web logs with people all over the world. The qualitative definition of "neighborhood" will be addressed later, but is briefly defined here as a physical manifestation of a community that lends a collective identity in the form of an environment, characterized by proximity and vicinity, sometimes coupled with a culture or an activity. Shared geographic location undoubtedly encourages and fosters communities, and successful ones can have multiple communities that thrive.

To return to the term "living," this was used to create a distinction and place a commentary versus the term "residential tower." Unfortunately, a "residential tower" – a term also purposefully used throughout this thesis

1. Howeler, Eric. Skyscraper: Vertical Now. p. 7

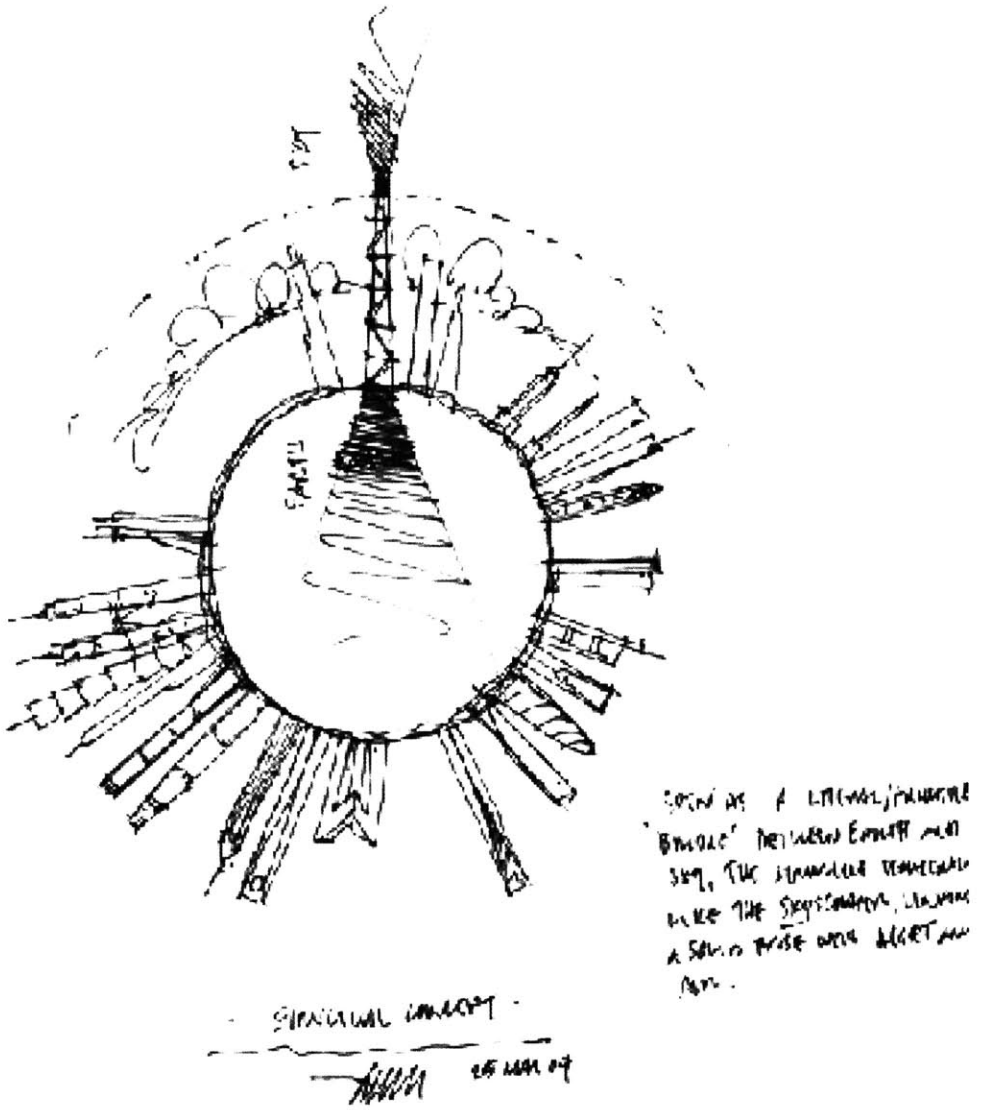

FIG. 5.1. Sketch - structural concept.

– is just that – a tower with residences and in most cases, not much more. However, "living" implies a plethora of activities that are associated with homes including the needs of everyday living such as food and laundry, as well as the social interaction that plays a major role in our lives. Implicit in the "Living Skyscraper" is a place to live, and not simply a collection of assorted residences.

At an urban scale, the "Living Skyscraper" also has a different definition. It describes a symbiotic relationship with the city, rather than the typical 'vacuuming' people off the streets of the city. The "Living Skyscraper" is designed to be systematically dependent on both the natural and physical/programmatic environment, as well as the social and cultural resources of the city. The vertical neighborhood acts as a fluid extension of the city, giving back to city in the form of program, public space, a large population in the city center, etc. The "Living Skyscraper" becomes a part of what is an urban food chain, dependent on the environment to insure its own survival, and on the city to provide identity and culture.

the vertical neighborhood *designing dependent diversity*

In *Delirious New York*, Rem Koolhaas presents a cartoon of the theorem for a utopian tower, recognition that the tower is nothing more than a repetition of land.[1] What was presented as the ideal performance of the skyscraper of 1909, has not changed in nearly 100 years.

The cartoon illustrates suburban streets, one stacked upon the other among the clouds. A caricature of what a vertical neighborhood should be, planes weave in and out serving, along with the proportionately small elevator, as the only connection between one floor and the next. This 'vertical neighborhood' in effect divorces every street, allowing each to exist without the other. Unfortunately, this caricature remains even more relevant today, as it is physically manifested in residential skyscrapers all over the world.

Successful neighborhoods add a certain vitality and diversity through the populations they attract and lend to other adjacent parts of the city. Neighborhoods benefit each other as they are all part of an interdependent network of communities that collectively comprise the city. Although skyscrapers attract similar populations, they often have a reverse effect on the city, by seemingly vacuuming people off the streets, and giving nothing back. It is my view that the residential skyscraper must be completely reconceived, not only to benefit the city, but provide the elements that are vital, and perhaps unique, to the vertical neighborhood.

The vertical neighborhood, to be successful, must borrow characteristics fundamental to the successful horizontal neighborhood in a city. These, however, must be selectively adapted in order to function within the physical constraints of the skyscraper. Jane Jacobs, who authored *Death and Life of Great American Cities* in 1961, presented

1. Koolhaas, Rem. *Delirious New York*, p. 82-85

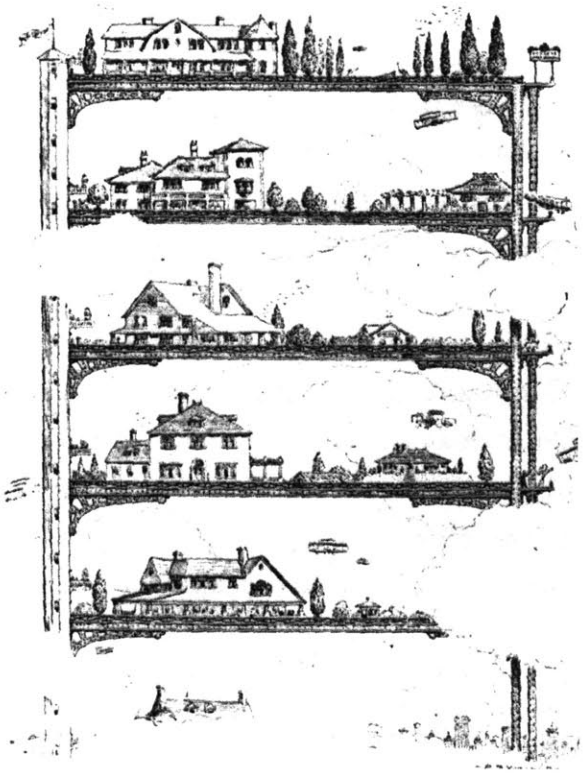

FIG. 6.1. 1909 theorem for a utopian tower.

to a generation of planners a description of the constituent elements of the neighborhood: she observed that diversity is fundamental to the success of the city. If we apply her ideas to the 'vertical neighborhood,' the vertical neighborhood not only has to promote diversity, it must act as an extension of the city in the sky, dependent on the diverse activities and resources of the city to maintain a healthy, symbiotic relationship.

Along these lines, the boundary conditions of the horizontal neighborhood work together in a similar fashion within the vertical neighborhood: small scale spatial boundaries must be clarified, while large scale boundaries must flow. Jacobs notes that within the small scale of the successful neighborhood, "a clear demarcation should exist between public and private, and cannot ooze into each other as they do in suburbs or projects."[2] Kenneth Yeang in *Reinventing the Skyscraper*, further states that spatial relationships in the skyscraper serving as an extension of the city should be synonymous with those external or public, internal or private, and transitional spaces similar to successful urban spaces.[3]

It extends beyond perceptions of safety. According to Jacobs, safety is also paramount to the success of a street or neighborhood, and that safety lies greatly on perception. In the vertical neighborhood, however, safety is more complex. Designers must not only accomplish this goal of safe urban design, but must provide life safety, essential to the skyscraper, and a fundamental goal of architecture.

2. Jacobs, Jane. *Death and Life of Great American Cities.* p. 35
3. Yeang, Ken. *Reinventing the Skyscraper: A Vertical Theory of Urban Design*, p. 13

JUSTIFICATIONS AND CONSIDERATIONS FOR THE VERTICAL NEIGHBORHOOD

In order to limit the scope of this discussion, the neighborhood is defined, or rather, identified as an area or vicinity within a city whose residents can identify with anything from a culture, like ethnicity in Chinatown, or a common activity, like that of Wrigleyville or Fenway, to sharing physical attributes, like architecture in Boston's Back Bay, or proximity, like Chicago's Lincoln Park. The neighborhood is not a suburb or a small town – these entities tend to be clearly defined and introvertedly self-sustaining. Rather, the neighborhood is an organism that contributes to the health, identity, and culture of a city.

Turning towards the residential skyscraper, despite the fact that it has populations comparable to city neighborhoods, no long-term prototype exists for the building type that is configured for the necessary social interaction in what essentially constitutes a vertical neighborhood. Visible activity is limited inside to elevators and corridors. Outside, the residential skyscraper typically has a parasitic relationship with the city – feeding off its population to fund its own existence, and giving nothing back.

As cities grow denser, the skyscraper as a building type becomes even more essential to the success of the city as a community. Design should shift from architecture as facade design for a severely privatized form of development to architecture as spatial, urban community design. If diversity is paramount in the success of the neighborhood, then the conventionally homogenous residential skyscraper needs to be seriously reconsidered. The residential skyscraper as it exists today is something of an oxymoron – that is, as a skyscraper, it is not truly "residential."

The residential skyscraper does accommodate a diverse population of people as it stands today. However, that "diversity" comprises mainly two populations which find themselves being segregated by the supposed benefit to each of high-rise living. The poor rely on the density and economy of the high-rise, while the rich capitalize on convenience, views, and sometimes fresh air. [4] Although high-rise public housing in Chicago will soon be history and replaced by low-rise, mixed-income housing, inherent in all residential high-rises is design for privacy. Ironically, design for privacy has translated to a building type that is not conducive to living in a community or neighborhood.

Considerations for the vertical neighborhood must build off of the systems that comprise the healthy, horizontal neighborhood. These systems must be reconfigured for vertical living, while maintaining diversity, boundaries, and safety, and a socially and culturally-enriching dependency on the city.

DIVERSITY VIA PROGRAM

The distribution of various programs and their abilities to change, adapt, and evolve are essential to attracting diversity, or rather, providing the right conditions for diversity to flourish. Borrowing from Jacobs, a network of programs can be considered in four categories – public space, retail, housing, and working. Public space, comprised of parks or squares, allows spontaneous, social interaction to occur via recreation. Retail, carefully distributed, can assure activity at varying times of the day, attracting people with varying interests. Flexible housing options insure an economically diverse population, while places for working maintain an ongoing human presence and a diverse series of activities throughout the day. While each of the four categories should maintain an ability to attract

4. Taniguchi, Jan Tokuichi. "Vertical Neighborhoods: A Residential High-Rise Exploration," p. 6.

diversity in one form or another, they are all endlessly interdependent – retail feeds off of the residential and working populations, while the activity in public spaces require the population from retail, housing, and working combined. It is the activity in the public spaces that will attract housing populations, which in turn promotes retail and business and creates a working population. Each program invites diversity unto itself, but no singular program can sustain the health of an entire neighborhood.

Just like each program is dependent on the other, the neighborhood and the city have a similarly symbiotic relationship. However, dependency rests on diversity at various scales. At the macro scale, the vertical neighborhood as a whole must add diversity to the city, while at a micro scale, it must provide a diverse, yet identifiably unique culture to the individual street populations within.

BOUNDARIES

The 'boundary' many times implies a two-dimensional division, however in this case it must be considered spatially. Therefore, Jacobs and Yeang's systems described earlier, consisting of horizontal circulation, vertical circulation, and thresholds, will require the most adaptation for vertical living.

City streets provide horizontal circulation. Jacobs notes that the city's streets accommodate all sorts of activities at varying scales or speeds: those who loiter, pedestrians, runners, cyclists, and automobiles. In a vertical neighborhood, activities would be limited most likely to pedestrians and loiterers. Corridors in the vertical neighborhood must be conceived as 'streets,' and must be reconfigured to accommodate the activities of the pedestrian and loiterers. This

will also require visual activity that, although it does not parallel that of the horizontal street, achieves a genuine visual diversity appropriate for the adjusted scale of the pedestrian.

Unique to the vertical neighborhood is publicly accessible vertical circulation. The elevator (and elevator lobby) becomes a unique public activity. Waiting for an elevator is synonymous to waiting for a train, but occurs at much more frequent intervals. In terms of interaction with the city, the elevator could be viewed as synonymous with the automobile, providing maximum exposure – limited by speed – to all the retail and people in the neighborhood. In other words, the elevator allows the pedestrian to visually 'skim' the vertical neighborhood as those in automobiles when driving through horizontal neighborhoods in the city. Despite the absence of the train and automobile in the vertical neighborhood, the elevator is simultaneously analogous to both, and must be reconfigured from the conventional elevator cabs in order to preserve the beneficial social and visual activities that public transportation and automobiles normally provide. However in any neighborhood, there are multiple options to travel, and the vertical neighborhood can also introduce travel in a secondary mode. Ramps and stairs, the latter required for life safety and unique to the vertical neighborhood, encourage walking, and therefore social interaction and visual activity.

Jacobs argues that in a successful and diverse urban neighborhood, the threshold that demarcates what is public and what is private must be clearly defined at the scale of the dwelling – this is what sets suburbs apart from the city. At the scale of the street, however, Yeang argues that spaces must flow from one to the next, like the streets of adjacent neighborhoods. Here, both work together because the vertical neighborhood, as an extension of the street, must

maintain continuity with existing streets and neighborhoods. This transforms the conventional perception of the skyscraper from a building entered on the ground plane, to a series of dwellings entered in the sky. The threshold between indoor and outdoor is moved from the conventional lobby to the actual door of the dwelling unit. This implies that the 'street' remains open to the public.

Perhaps the most critical element in the successful transformation of the horizontal neighborhood to a vertical orientation is the 'spatial threshold,' between the public 'street' and the private dwelling unit. Herman Hertzberger expands in detail upon Jacobs' argument to define the public versus private threshold in *Lessons for Students in Architecture*. Although 'threshold,' like 'boundary,' implies a two-dimensional relationship, Hertzberger insists that 'public' and 'private' should be seen as spatial concepts, and rely more specifically on the ideas of accessibility and responsibility.[5] It is these two characteristics that define what is public and private. "An open area, room or space may be conceived either as a more or less private place or as a public area, depending on the degree of accessibility, the form of supervision, who uses it, who takes care of it, and their respective responsibilities."[6] This 'spatial threshold' then creates a malleable gradient between public and private space.

Hertzberger notes that this spatial threshold naturally exists, but must be recognized. The threshold extends far beyond the street and the front door, and the gradient occurs in varying degrees. For instance, the typical American suburban home has several, mostly unrecognized, gradients working at once. The street, the most public, varies from the sidewalk. Separated by a stereotypical line of trees from the street, the sidewalk is perceivably more private than the street due to its proximity to the home and its slower scale in speed – the pedestrian on the sidewalk can

5. Hertzberger, Herman. *Lessons for Students in Architecture*, p. 13
6. Hertzberger, Herman. *Lessons*, p. 14

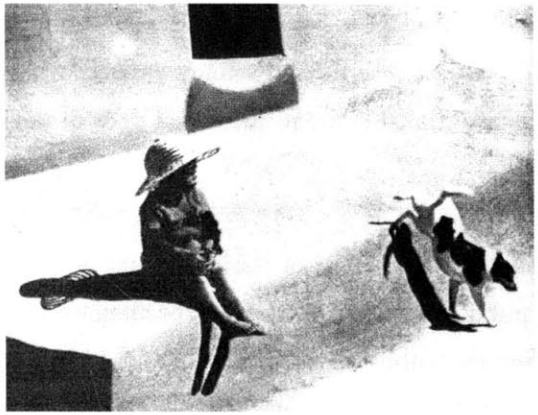

FIG. 6.2. Child sitting on step.

FIG. 6.3. Montessori School in Delft. Herman Hertzberger.

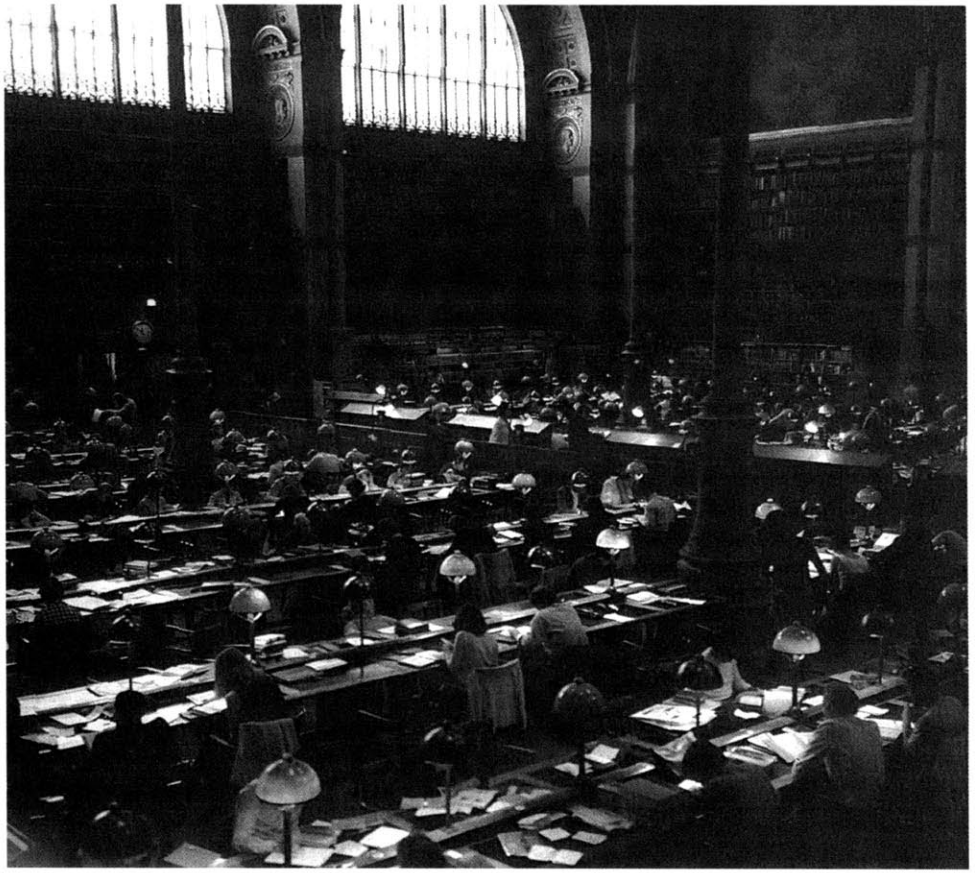

FIG. 6.4. Bibliotheque Nationale, Paris.

be more easily supervised. Standing at the front door can practically feel like an invasion of privacy, relative to the position of the street within the gradient. However once inside, the living room then becomes the most public, while the bedrooms, after the kitchen and family room, are the most private. Still, the bathroom relative to the bedroom – depending on the user and family – is actually the polar opposite of the street, being the most private. Suddenly, standing at the front door doesn't seem as invasive anymore.

Once this spatial threshold and its gradients are recognized, Hertzberger notes that only subtle physical cues are necessary to intuitively articulate them. In Labrouste's Bibliothèque Nationale in Paris, a simple raised shelf between facing desks declares the reading desks as private, while the shelf is shared as public space.[7] Additionally, subtle visibility can lend an intuitive visual cue: glass doors allowing one to see through to the space behind symbolizes that the space beyond is readily accessible and therefore public, whereas solid doors signify privacy.[8]

These spatial thresholds and cues work together in Hertzberger's example of the child sitting on a step: "The child sitting on the step in front of his house is sufficiently far away from his mother to feel independent, to sense the excitement and adventure of the great unknown. Yet at the same time, sitting there on the step which is part of the street as well as of the home, he feels secure in the knowledge that his mother is nearby. The child feels at home and at the same time in the outside world. This duality exists thanks to the spatial quality of the threshold as a platform in its own right, a place where two worlds overlap, rather than a sharp demarcation."[9]

Hertzberger's Montessori School in Delft illustrates the meaning of making the spatial threshold a place, offering a

7. Hertzberger, Herman. *Lessons* p. 17
8. Hertzberger, Herman. *Lessons* p. 18
9. Hertaberger, Herman. *Lessons* p. 32

welcome for children who arrive early or who do not want to go straight home after school.[10] This lesson is critical to the vertical neighborhood, where social interaction is complicated by the vertical orientation. In order to provide adequate opportunities for interaction, the spatial threshold must encourage this by design and not solely rely upon happenstance.

SAFETY

Jacobs defines safety in the city as comprising of perception and privacy. According to Jacobs, what sets cities apart from suburbs or towns are the large amount of strangers one encounters in the city. Perceptive safety is the ability to feel safe around strangers, provided by a street being actively surveyed and supervised, by either passers-by or the orientation of the architecture. Windows facing a street create opportunities to be seen and observed even without anyone visibly watching. Windowless alleyways, however, are always perceived to be unsafe.

Privacy, aside from the superficially visual aspect of it, can be defined as the relationship to strangers and the community. The ability to remain anonymous in a community provides security. This is obviously related to perception.

Jacobs's definitions of perceptions and privacy are adequate for the horizontal neighborhood, however expedient evacuation is an additional requirement of the vertical neighborhood. The requirement that most sets the vertical neighborhood apart from the horizontal is borrowed from the architecture of the skyscraper – life safety. Fire in a vertical neighborhood can potentially affect a much more substantial population than one in a horizontal

10. Hertzberger, Herman. *Lessons*, p. 33

neighborhood. The fire threatens not only all residents above by smoke that rises, but the structural integrity of all residents below. Every attempt must be made to allow multiple modes of smoke-proof egress, and to minimize damage to preserve the existence of the vertical neighborhood. Inconspicuously integrating life safety circulation systems into the vertical neighborhood without sacrificing spatial fluidity or the perception of safe public space may be perhaps the most complex challenge.

Finally, shared by both the horizontal and vertical neighborhood is the role of the community – an ability, and/or space, that allows meetings to 'govern' the neighborhood and make changes to policy as inevitable problems arise. The role of the government in the vertical neighborhood differs from that of traditional home associations or management companies. The governing body must expeditiously address problems unique to living within a vertical orientation.

THE VERTICAL NEIGHBORHOOD TOMORROW

Today, the vertical neighborhood only superficially exists in theory. Office floors in high-rises, divorced from any activity on any other floor, have increasingly been designed as 'landscapes,' acknowledging the value of social interaction within the workplace. These floors are stacked and repeated one after another, serving as realizations of the 1909 theorem for the Globe Tower, and by default comprise the best attempt to date at achieving a vertical neighborhood.

If we examine the phenomenon more closely, it is clear that the most recent revolution in office planning can be

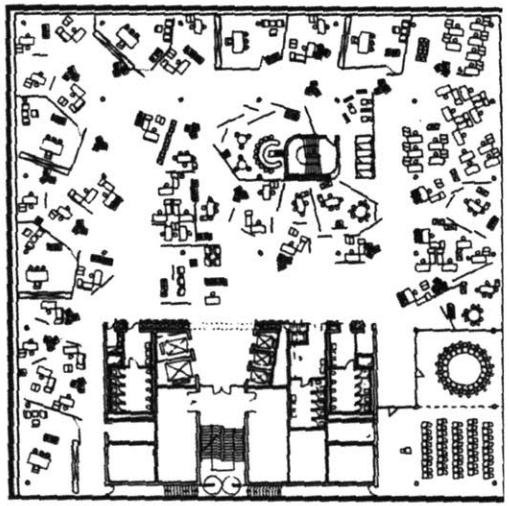

FIG. 6.5. Buerolandschaft plan.

traced to new innovations in communications technologies. These technologies were made possible by advancements in the Internet. Increasingly smaller, portable devices have allowed workers to become highly mobile, in many cases no longer requiring a constant physical presence in the office. In his essay "Form Follows Fad: The Troubled Love Affair of Architectural Style and Management Ideal," James S. Russell writes about the evolution of post-World War II office planning and the "organizations [who] seek the adaptable, interchangeable person."[11] The mechanization of architecture and its mechanical systems had brought with it a series of modular office standards including wide-open office floors with fluorescent lighting, air-conditioning, and acoustic tile ceilings – a series of flexible systems intended to accommodate a now 'improved, mechanized' office culture. The workplace, like the office culture, became anonymous and undifferentiated.

According to Russell, the 1960s "promised a reexamination of the role of environment in nurturing better performance as the management era of human relations emerged with the field of environmental psychology."[12] Methods of working including communication and team performance were considered in evaluating the effects of the physical environment of the workplace. The foundation for the 'office landscape,' or bürolandschaft, was born.

With the belief that office layouts should be based on close communication coupled with efficient workflows, brothers Wolfgang and Eberhard Schnelle founded the Quickborner Consulting Group outside Hamburg, Germany. Fluid, democratic workspaces replaced the gridded, hierarchical offices that followed mechanization. Herman Miller responded to this innovative approach to office planning by developing the Action Office II in 1968, a series of user-friendly interchangeable workstations based on a 5' hexagon – divorced from the rectangular

11. Russell, James. "Form Follows Fad," p. 56
12. Russell, James. p. 56

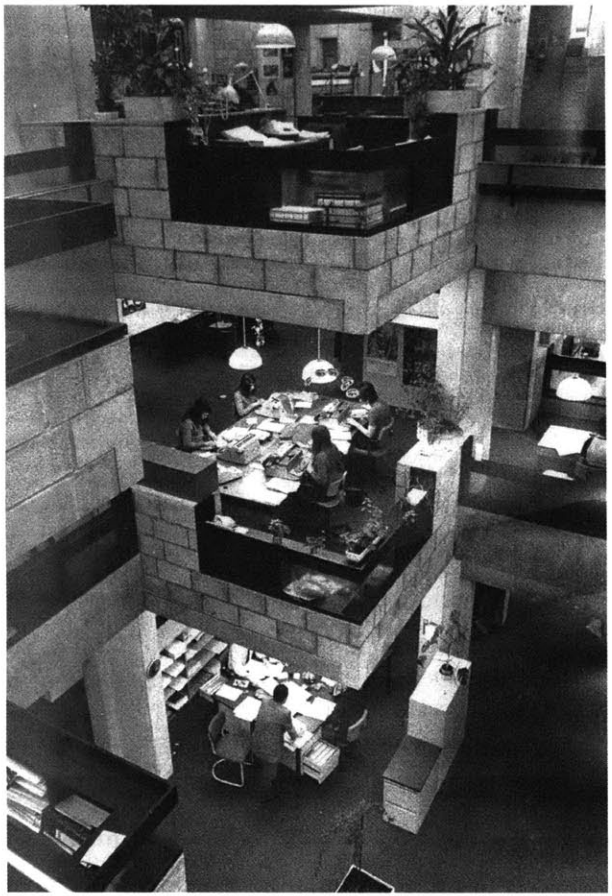

FIG. 6.6. Centraal Beheer Insurance Building. Herman Hertzberger (1972).

module of the post-World War II skyscraper. Bürolandschaft caught on quickly in the United States as it saved space and money, however hexagons evolved into more economical rectangular cubicles that are commonplace in most American offices today.

This approach to office planning essentially ostracized the architect of the skyscraper from the interior – the interior was reserved for various tenants to hire other architects or consultants who specialized in interior design – the 'fit-out' architect. If the 'fit-out' architect designed single floor 'neighborhoods' or 'villages,' then the skyscraper architect has been reduced to designing a weather-barrier – the facade – that encapsulates this 'vertical neighborhood.'

An exception to this was Herman Hertzberger's Centraal Beheer Office Building of 1972 in Apeldoorn, Holland. Not necessarily a high-rise design, it represents the anti-skyscraper on many levels. First, the distinction between the inside and outside is blurred. Hertzberger writes in Articulations, "this 'building,' an entity subdivided into smaller buildings, is no unambiguous volume but an open structure, a three-dimensional grid where the internal-external relationship is fundamentally confused; you are neither inside or outside but rather in a permanent state of transition," [13] Hertzberger in this case prohibits any opportunity for the existence of the 'fit-out' architect. In actuality, the building was deliberately left unfinished, allowing the individual user to shape and define their own space. [14] Secondly, and perhaps most importantly, the scale of the individual can be read throughout the building, and is not one of many anonymous units within the floor plate of an office building. In other words, the office of the individual, combined with colleagues, generates the external form of the architecture. This organically cellular composition also theoretically dictates all mechanical systems to be flexible and considerate of each individual

13. Hertzberger, Herman. *Articulations*, p.78
14. Hertzberger, Herman. *Lessons*, p. 23

module – not a compromise between an entire group of individuals in a skyscraper, who must be flexible and considerate to a single mechanical system.

Centraal Beheer Office Building is perhaps the best precursor to the 'vertical neighborhood' – not in its orientation insofar as vertical circulation, but rather the accessibility of its corridors. These arcade-like corridors that are formed by cellular office blocks were originally intended to be completely open to the public, incorporating ticket counters for the adjacent railway station. Hertzberger concedes that this concept was scaled back, but without detracting from the 'town' concept. In fact, despite many changes in the Centraal Beheer organization since 1972, the building remains virtually the same today.

It is important to note that Centraal Beheer is not an 'anti-skyscraper' in its height. This argument is too literal and could be countered by the fact that Centraal Beheer's three dimensional grid could theoretically expand infinitely in any direction, even vertically, without compromising its success in scale. Besides, the argument of physical height would neglect Hertzberger's inversion of the relationship between the individual and architecture – a network of individual expression informs the architecture, which adapts to accommodate users' needs, not thousands of diverse users conforming to a network of systems in a homogenous skyscraper. Human scale takes precedent over an expeditious and insensitively unscaled way of design.

As I've noted above, the residential skyscraper today is an oxymoron. The requirement for diversity in a vertical neighborhood makes it impossible for it to fit within today's conventional, homogenous skyscrapers. Like

Hertzberger's Centraal Beheer Office Building, the vertical neighborhood requires a unified network of individual expression that is allowed to dictate a malleable architectural form. Unlike today's conventional skyscrapers, which "vacuum" people off the streets, tomorrow's vertical neighborhood will have to participate in a mutually sustaining relationship with the city – an organism far more complex in its everlasting dependency on its population, environments, and cultural institutions like the neighborhood.

mapping the vertical neighborhood

If this thesis qualitatively borrows characteristics from the successful horizontal neighborhood as defined by Jacobs, then perhaps the act of physically mapping the vertical neighborhood should borrow some of the physical traits as well.

The ordering system of the neighborhood comes as a default: it is designed at the scale of the larger city or metropolitan area that is comprised by a series of neighborhoods, which inhabit an "x" number of city blocks. So the grid of the city, or other variations on the theme, is imposed on the neighborhood.

Although there may be geometrical significance to the grid system, what is common throughout is the fact that the network of streets – whatever their arrangements may be – provides multiple options for movement. This concept of multiple modes of fluid circulation runs coincidentally with some of the life safety issues of the skyscraper by distributing a series of egress paths throughout the tower in place of a centrally located and thereby more vulnerable singular circulation space.

In addition as the following three neighborhood precedent studies will indicate, neighborhoods are normally linked with each other by a series of major streets and thoroughfares, where retail begins to emerge and hopefully flourish, feeding off the exposure of not only residents, but those who visit or simply pass through a given neighborhood. Areas beyond this retail center become quieter, residential streets that provide a variation in visible activity, creating a greater sense of privacy.

What follows is a brief examination of three neighborhoods that have three distinct forms of identity, both in their cultures and physical environments:

WRIGLEYVILLE

Wrigleyville's identity is centered around the Chicago Cubs. Its name takes after Wrigley Field, home of the Chicago Cubs for about 100 years, and is a neighborhood that exists within the larger Lakeview neighborhood that sits north of Chicago and just west of Lake Michigan. Located at the corner of Clark and Addison streets, Wrigleyville's boundaries can be approximately defined by Irving Park Road to the north, Roscoe Street to the south, Halsted Street to the east, and Southport Avenue to the west.

These physical constraints exist not as defined boundaries, but rather by traffic congestion and its proximity to the activity that Wrigley Field generates. This is perhaps best illustrated by the relationship of the ballpark to the houses on Sheffield and Waveland avenues that fall just outside left field and right field, respectively. Owners of these residences have built 'rooftop bleachers' on top of their structures that face the field. The influence of the Chicago Cubs has manifested itself physically in the immediate vicinity around the ballpark, with many fans moving to the areas beyond.

Transportation on game days can become problematic. The Addison El station sits only one block east of Wrigley Field, and is perhaps one of the most popular ways of traveling to the site. Parking and traffic becomes a major concern with many parking restrictions in the area. Many residents choose to rent out parking spaces to visitors in order to supplement their incomes.

Wrigleyville has developed a reputation and culture of partying, with many sports bars, restaurants, and dance clubs sprouting up around the area and concentrating along Clark Street and Sheffield Avenue. This has attracted many college students, and young professionals, and therefore real estate investors have begun construction on new, larger apartment complexes among the 100-year old single family homes. Architecturally, the area is quite diverse with larger commercial buildings and these larger apartment buildings finding themselves mixed among the two and three flats that dominate the area.

CHINATOWN

Chicago's Chinatown is located south of the downtown, and finds its collective identity identity in a cultural heritage and tradition, and maintains an intense loyalty among the area Chinese-American populations.

T.C. Moy was the first recorded Chinese-American to settle in the Chicago area in 1870. After he realized that the anti-Chinese sentiment that pervaded across the country was not as intense in Chicago, he encouraged others to move to the area around Van Buren and Clark Streets. However, news of the poor treatment of Chinese in California reached China and there was an immediate ban on American goods. This hurt the local economy and in 1905, landlords retaliated by raising rents so high that the Chinese-Americans were forced to move to their current location centering around the intersection of Cermak and Wentworth streets.

Like in most other cities, immigrants move to Chinatown for safety, protection, and security. They work in nearby factories or restaurants, many times commuting to the suburbs to work in restaurants there. After immigrants grow

more confident in their proficiency of the English language, they tend to move to suburbs for a better quality of life, but continue to come back and visit for the culture, food, groceries, and publications. In other words, there is a high turnover in residents in the area, but an extreme loyalty remains as many constantly return from the suburbs on a weekly basis.

Due to the physical constraints of the river to the west, train tracks to the east, and the Stevenson Expressway to the south, Chinatown cannot expand, and therefore land is quite scarce. There is also a racial boundary that exists: a stigma still remains among some, mostly elder members of the Chinese-American community that prevents residents to wander beyond the small confines of Chinatown. A public school to the south, and public housing projects to the east and west, are populated primarily by low income African-Americans creating a psychological boundary as well. The areas surrounding Chinatown have high crime rates and therefore further reinforce Chinatown's isolation.

As a result, affordable housing becomes a challenge among immigrants and long-term residents. Recently, the Chinese American Development Corporation (CADC) designed and built, with the help of city and federal grants, in two phases a retail center – Chinatown Square – and 160 townhouses, 150 low-rise town houses, and 120 senior citizen dwelling units on 32 acres just north of Chinatown. Included was also a large public square that provides a meeting place for community activities. This is in addition to a parking lot constructed between Chinatown and the train tracks to the east.

Despite layers of physical constraints on Chinatown, its economy, loyalty, and interest will continue to expand maintaining a sustainable population and community.

BACK BAY

Relative to Chinatown and Wrigleyville, Boston's Back Bay seems to lack the most in terms of providing a sense of community, and relies heavily on its architectural homogeneity to provide a sense of identity. This is not to say that communities do not exist, however they operate differently than in the aforementioned examples in that it is easier for outsiders to identify with or become a part of the community whereas the community that exists in the Back Bay seems more difficult to participate in.

The boundary conditions are clearly defined both spatially and through its highly ordered grid that contrasts the rest of Boston. Public spaces include the quiet park along Commonwealth Avenue and the retail district of Newbury Street, both of which connect directly to the Boston Common that forms the Back Bay's eastern boundary.

The bay windows and layered series of air conditioners, fire escape, electrical conduit, speak more towards the architectural history that is the Back Bay than the community that lives there.

...

Wrigleyville, Chinatown, and the Back Bay all share one common characteristic in that they have relatively fluid relationships with the city – one oozes into the other quite seamlessly and effortlessly. In order to borrow the physical characteristics of the horizontal neighborhood, the act of 'mapping' the vertical neighborhood resulted in taking an aerial photo of Boston's Back Bay and reading it vertically as if the façade of a tower.

Although this may seem overly simplistic or diagrammatic, what results is an ordered system of circulation that provides various options to move throughout the building on a day-to-day basis, yet maintains a clear means of egress in the event evacuation is necessary. The accompanying diagrams represent this evolution in mapping the vertical neighborhood.

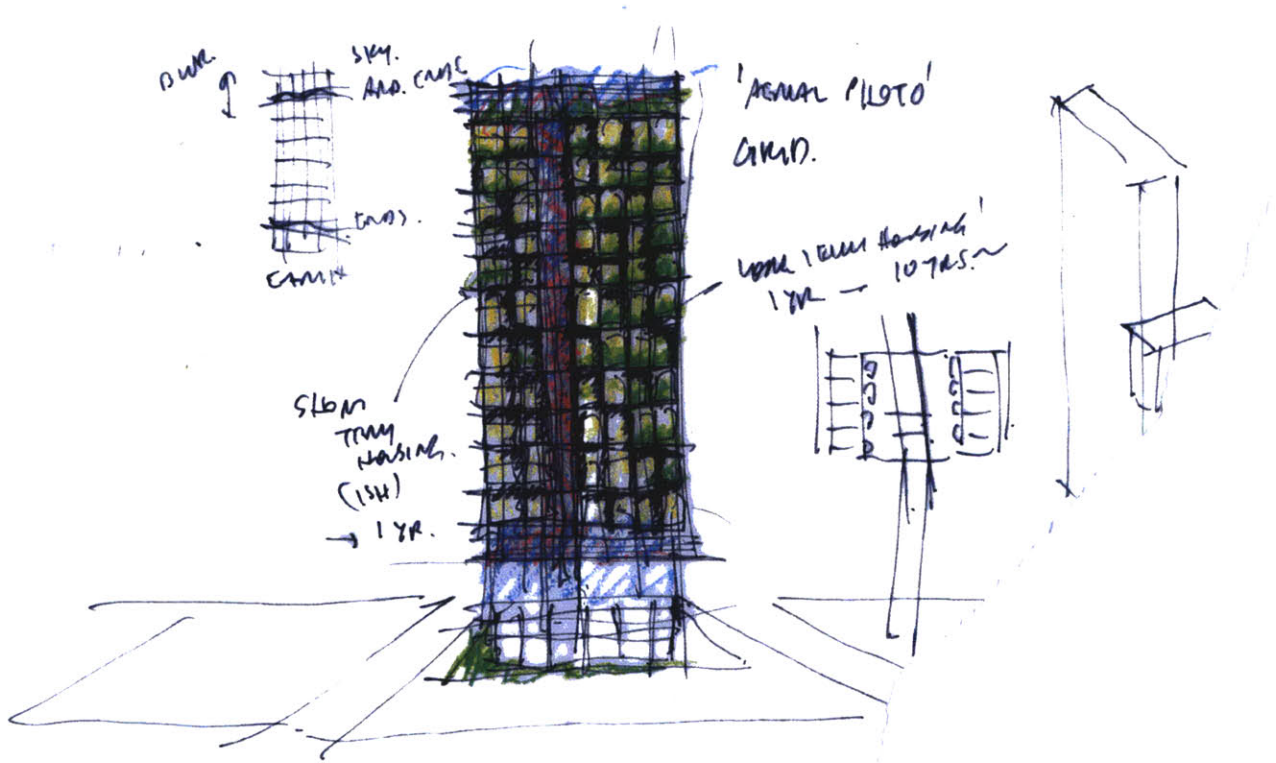

FIG.7.1 Sketch - mapping the vertical neighborhood

EVOLUTION

Figure 7.1 - First, the major circulation path defined by the color red was placed in the center of the tower, borrowing from earlier iterations but also with the intention of creating a centrally located means of major circulation, with an adjacency to retail opportunities noted in blue. However what resulted was an arbitrary and unfavorable bisection of the resident blocks indicated in yellow. There was a realization that the size of the tower was not so large as to require a central means of circulation.

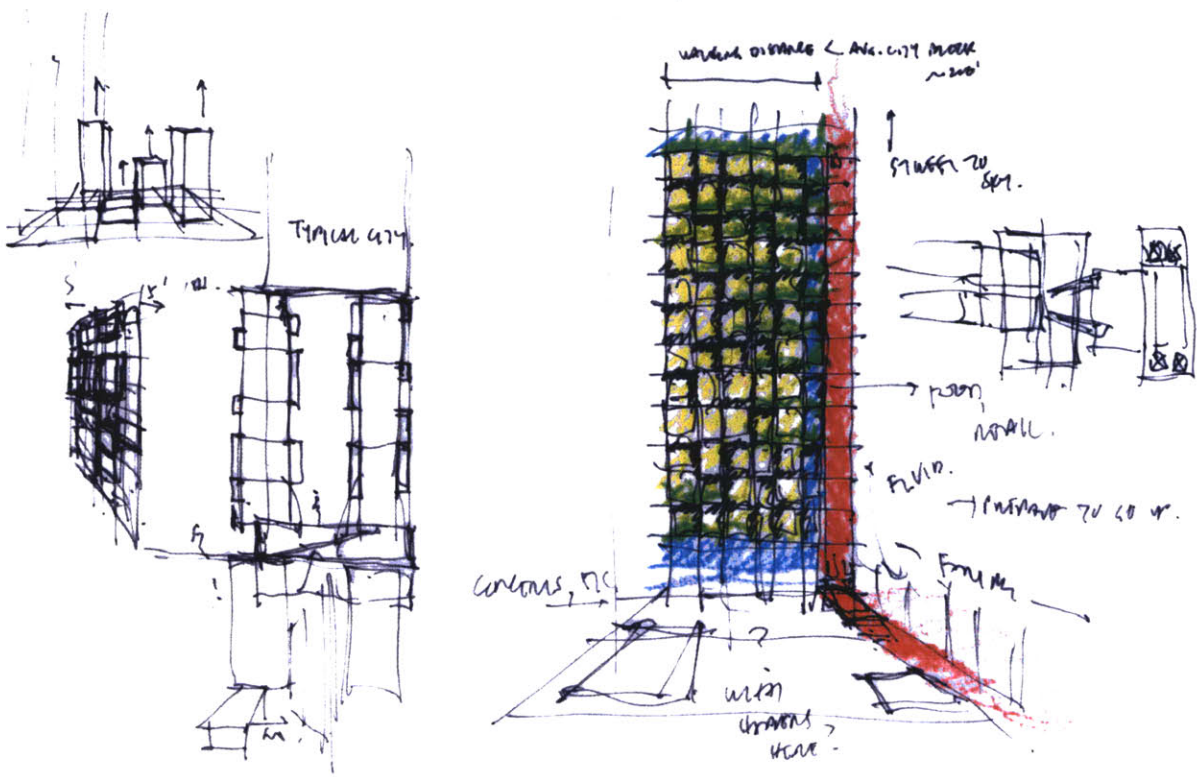

FIG.7.2 Sketch - mapping the vertical neighborhood

Figure 7.2 – By placing the major vertical circulation along the street side, it conceptually treats the skyscraper as a vertical extension of the street. Since the main circulation is now aligned with the street, a more fluid connection can be made between the city and the vertical neighborhood. Now, the residential block becomes a larger, unified entity on the façade, presenting a simpler reading of the vertical neighborhood to the city.

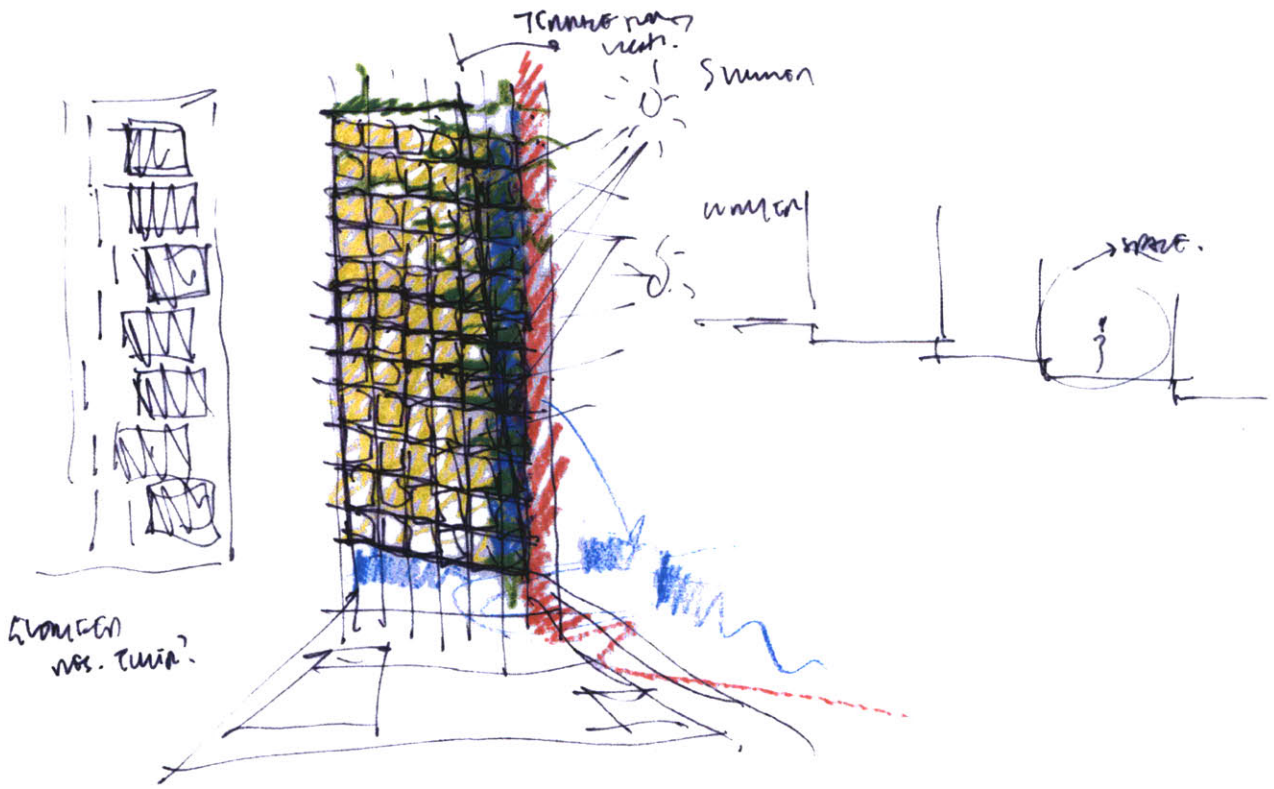

FIG.7.4 Sketch - mapping the vertical neighborhood

Figure 7.4 – The retail portion as a series of stacked pieces that interlock with the residential portion was studied, however the proportion of retail to residential spaces seemed unsustainable as there may not be enough residential population to support the retail businesses.

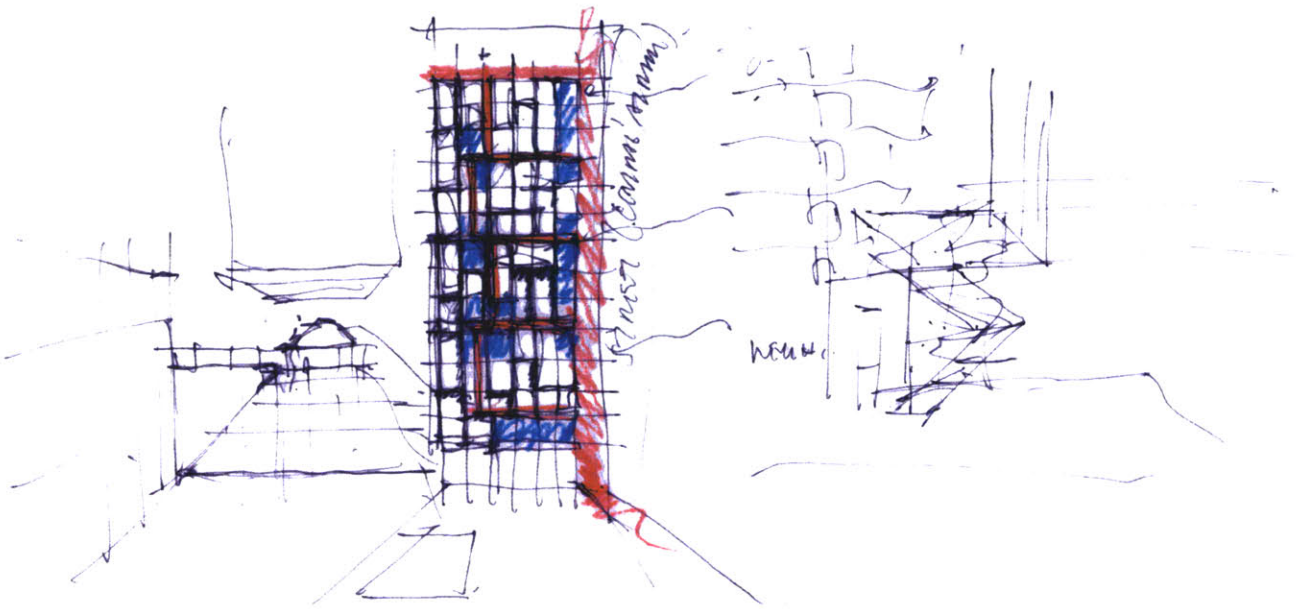

FIG.7.4 Sketch - mapping the vertical neighborhood

Figure 7.4 – This diagram represents an attempt to place a hierarchy of movement throughout the residential block, breaking down its scale into smaller identifiable blocks by inserting smaller avenues that run horizontally from the vertical street. These created added public spaces and dramatically increased the freedom of movement throughout the vertical neighborhood. Intersections of these secondary "avenues" could result in smaller retail ventures, perhaps more need-based services such as laundromats and dry cleaners, that would cater more to the needs of the residents and therefore would not require the exposure that would be provided along the vertical street.

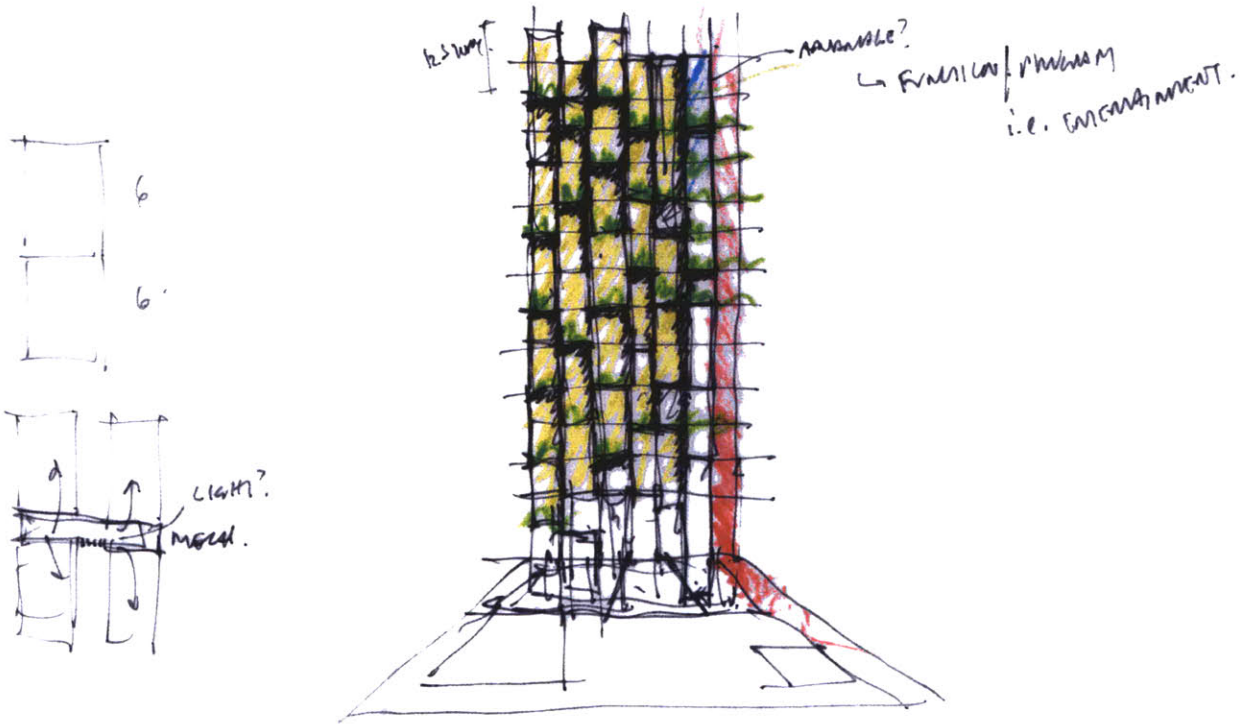

FIG.7.5 Sketch - mapping the vertical neighborhood

Figure 7.5 – The residential units were then terraced in an effort to imply some sort of vertical and horizontal connection with each other, different from the vertical street. Although potentially successful, it seemed as if this approach resulted in more of a ramped corridor-like condition and did meet objectives of creating a collective identity and community.

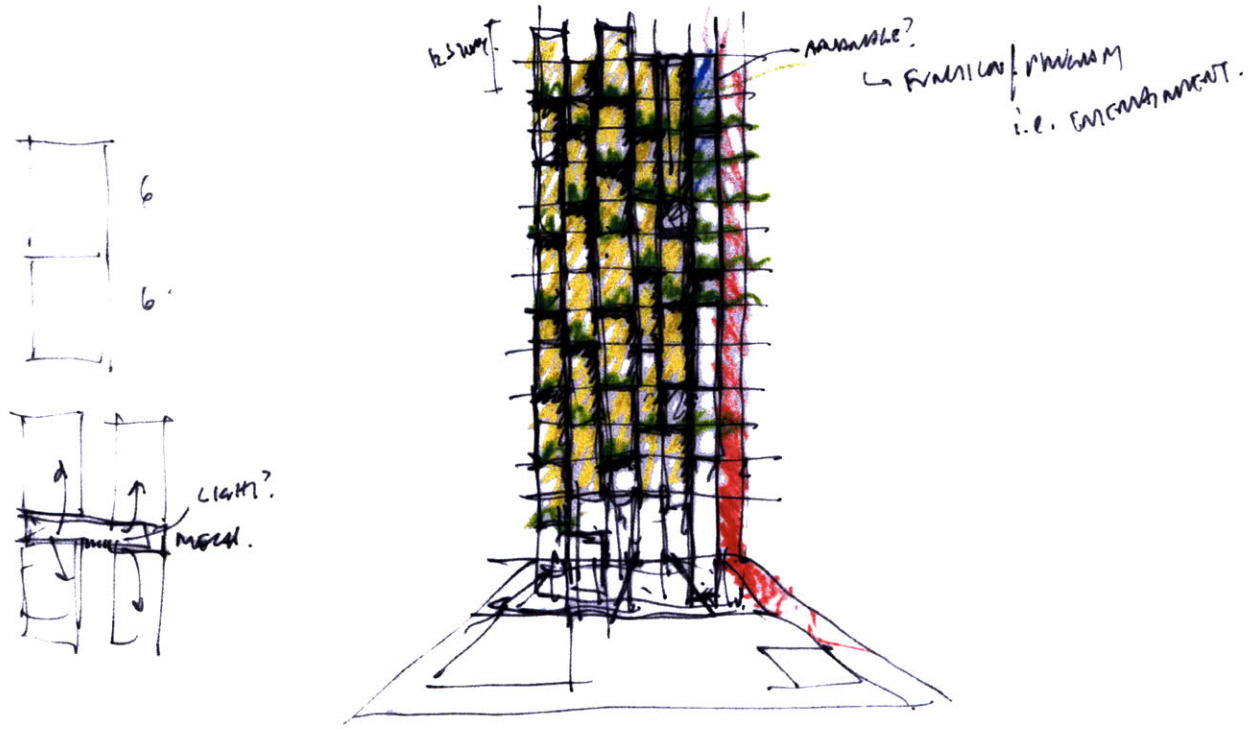

FIG.7.6 Sketch - mapping the vertical neighborhood

Figure 7.6 – Residential units were then combined to create groups of units on the exterior while maintaining a similar relationship with the retail and vertical street, and placed in a kind of running bond interlocking arrangement to more effectively create a vertical link between blocks of residences.

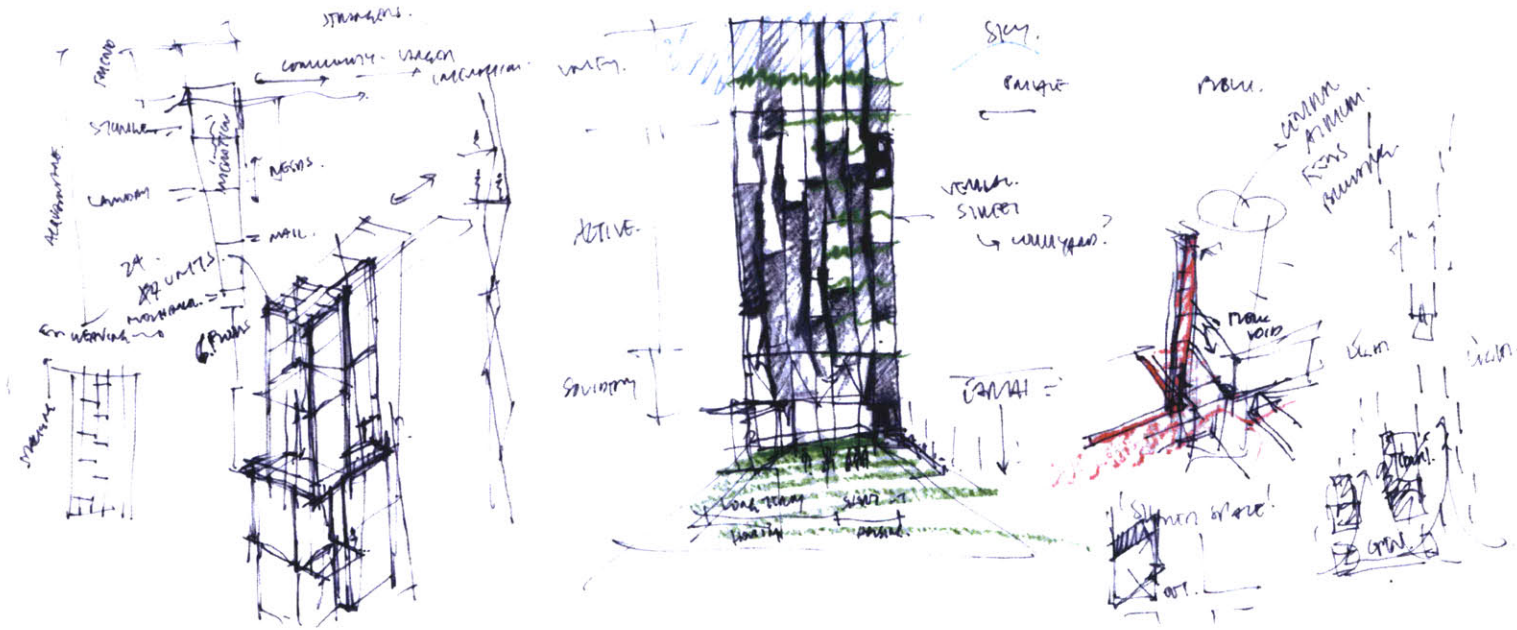

FIG.7.7 Sketch - mapping the vertical neighborhood

Figure 7.7 – These overlays suggest a skin system that is allowed to wrap around residences yet open up voids to signal public spaces. The ribbon-like quality of the permeable skin would allow light and natural air to permeate the building, creating a microclimate for the vertical neighborhood.

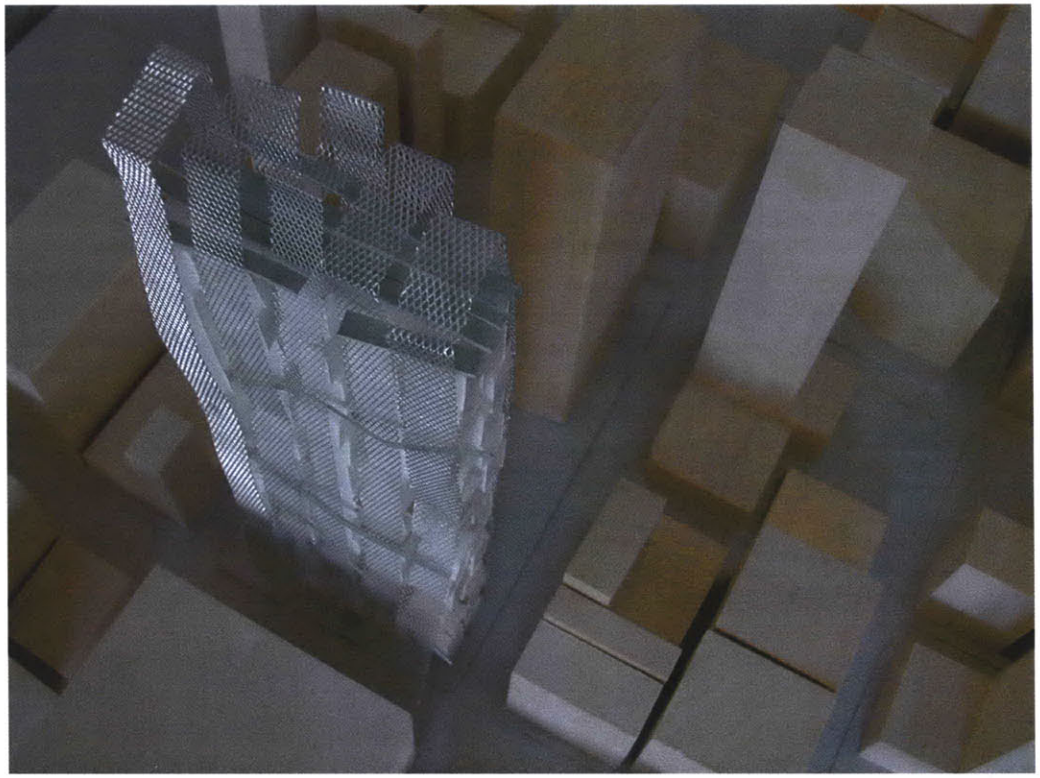

FIG.7.8 Concept model

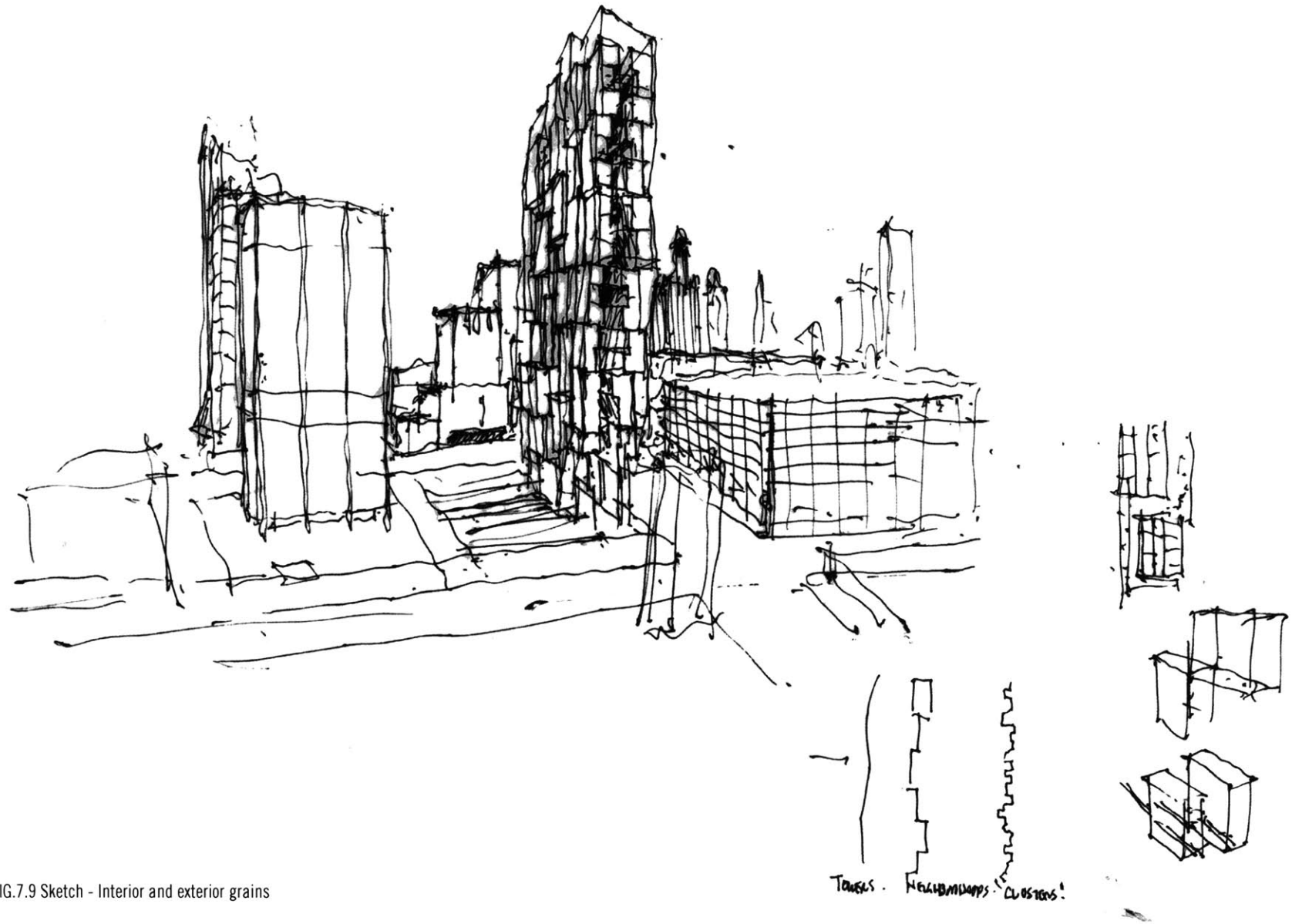

FIG.7.9 Sketch - Interior and exterior grains

Figure 7.8 - When the objectives of the skin and initial ordering system are combined, what results is a series of towers bundled together. These are separated by vertical "streets," that house elevators and stairs that link the "avenues" with the dwelling units. A five tower approach was selected as a result of consulting code and then balancing that with proportional programmatic requirements.

Chicago Building Code requires in residential dwellings that the distant to an approved exit exceed no more than 100 feet from a dead-end corridor. Therefore, since the width of the site is approximately 400 feet, then 4 towers would meet this requirement. However, assuming the vertical street inhabits one of these tower in its entirety, it would leave only three towers for residences that would decrease the number of residences and needlessly increase retail. Henceforth, a five tower approach was favored that would couple four towers of residential to one tower of retail, and also exceed code requirements increasing a factor of safety.

The concept model illustrates this matrix of dwelling units wrapped in a skin, and also suggests a woven series of gardens that would connect these larger blocks of smaller communities with each other.

These studies result in a conceptual sketch that shows the exterior of the building expressing the groupings of communities while the interior is broken down into a series of finer, smaller grained spaces that emphasize and express the individual. This concept constitutes the spatial matrix that comprises the vertical neighborhood.

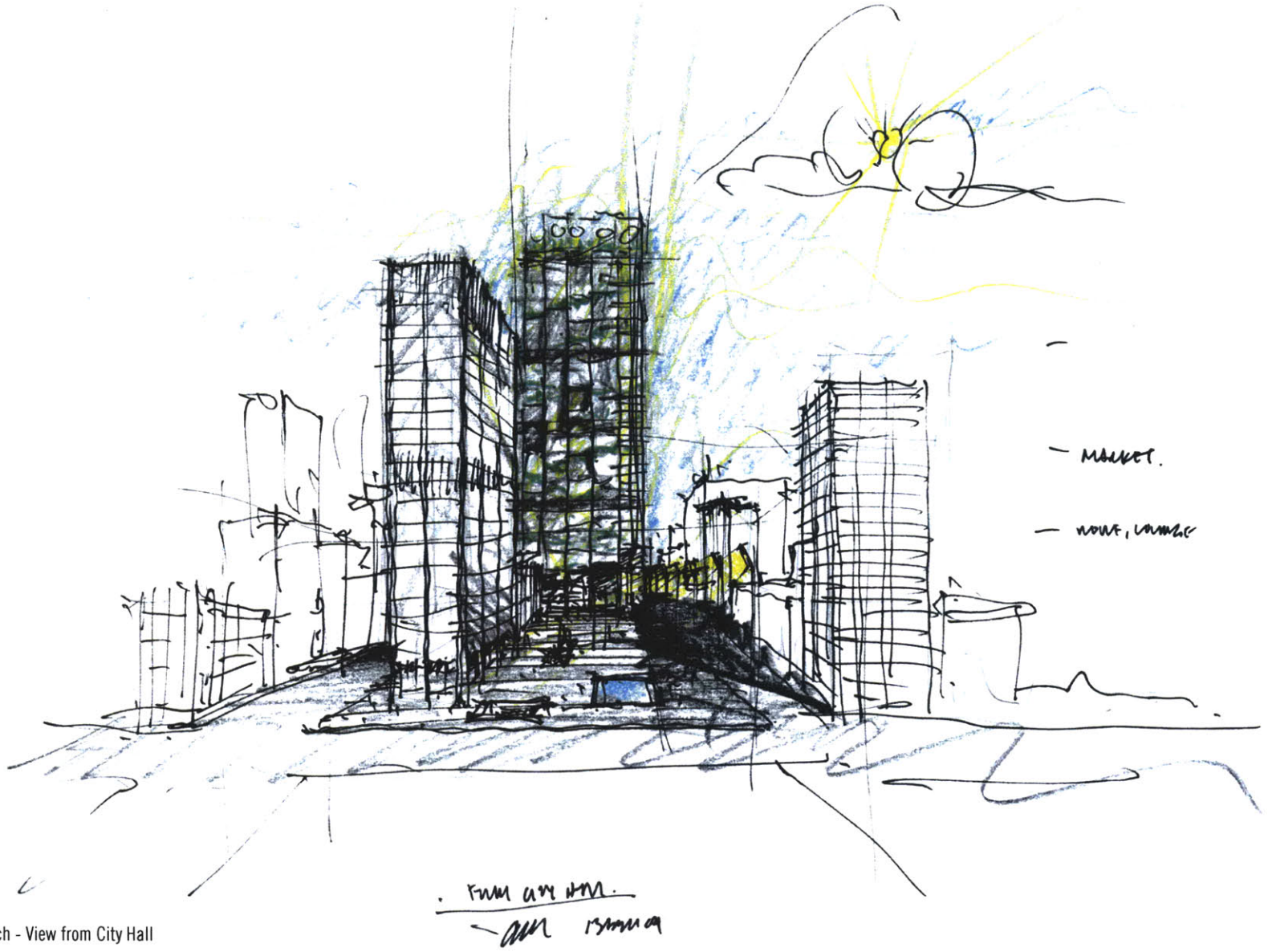

FIG.7.9 Sketch - View from City Hall

block 37 *the $100 million vacant lot*

Rarely does property in Chicago's Loop remain vacant for very long. Even rarer are instances when vacant lots accidentally evolve into successful urban spaces invaluable to the city.

Such is the case for Block 37 – three acres of nothing but potential. After $100 million was invested into the site since 1981 between the city of Chicago and various private developers[1], only a vacant lot in the heart of Chicago's Loop remains to show for it. It is only fitting that its prime location is emblematically bounded to the west by City Hall and to the east by Marshall Field's (1907) flagship department store. While a tug-of-war between various mayors and their administrations and the private sector have failed to realize the projected financial value of the site, citizens have quietly turned Block 37 into an invaluable venue for the city.

Politics created Block 37 as a prime development opportunity in the heart of Chicago's Loop, while the pressure of private economic development – the promise of a substantial return on an investment – has failed to deliver to the city a design. As more money is lost in Block 37, expectations will continue to grow to satisfy greedy profit margins, and unrealistically recover money already lost in the investment.

Some unidentifiable force is preventing progress on this site, and by dissecting the history and factors that led to Block 37's complete demolition and demise, the following picture emerges: The public interest in the end has overpowered city politics and private development, combined.

The origins of the Block 37 name can be traced back to Chicago's conception. The federal Ordinance of 1785

1. Miller, Ross. Here's the Deal: The Buying and Selling of a Great American City. p. 228

divided the land of the new country into square-mile sections.[2] Then, local government laid out the smaller city grid of what eventually would include Chicago's Loop. Fifty-eight 3-acre rectangles were plotted out, as Block 37 received its designation prior to Chicago's incorporation in 1833.

Unlike other lots such as Block 39, which was reserved by the local government for a county courthouse, Block 37 was owned 'fee simple,' free of any government restrictions in their sale or trade.[3] This fact, combined with mounting debt for both the federal and local governments opened the door to the practice of buying and selling land as if it were a commodity.

According to Ross Miller, author of *Here's the Deal: The Buying and Selling of a Great American City*, unsettled land owned by the government either locally or federally was a seemingly infinite source of capital. After the Potawatomis sold 20 million acres of land near Chicago to the United States, the land was quickly turned and resold to settlers to help pay off the debt from the Revolutionary War.[4] The local government sold land to fund the Illinois and Michigan Canal, linking the Great Lakes with the Mississippi River.[5]

By 1838, Chicago's population had multiplied ten times over a period of two years, growing from 400 to 4,000. Speculators who purchased land from the local government quickly sliced up the property and resold it for substantial profits. Retail uses occupied only a small portion of the new lots, but as service businesses required office space that did not have direct exposure to the street, people built upwards and the 'space in the air' became more valuable.[6] Land further increased in value after the June 1834 announcement of the plan to build the Illinois and

2. Mayer and Wade, *Chicago: Growth of a Metropolis*. p. 16
3. Miller, Ross. p. 203
4. Miller, Ross. p. 206
5. Mayer and Wade. p. 26
6. Miller, Ross. p. 204

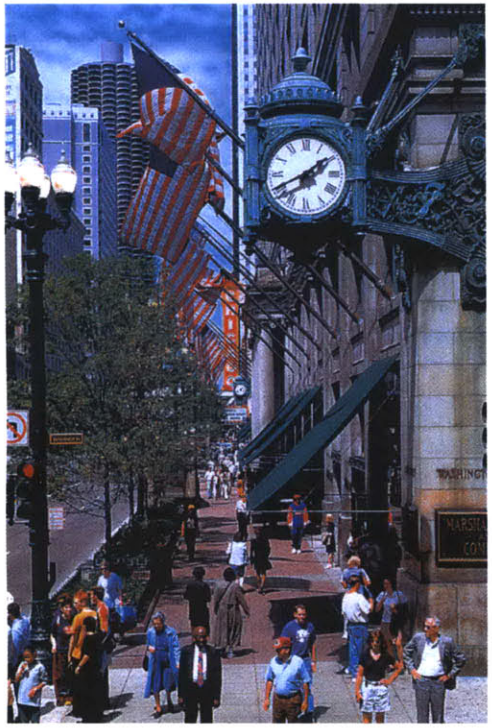

FIG. 8.1. State Street circa 2001.

FIG. 8.2. Marshall Field's on State Street, Holabird and Root

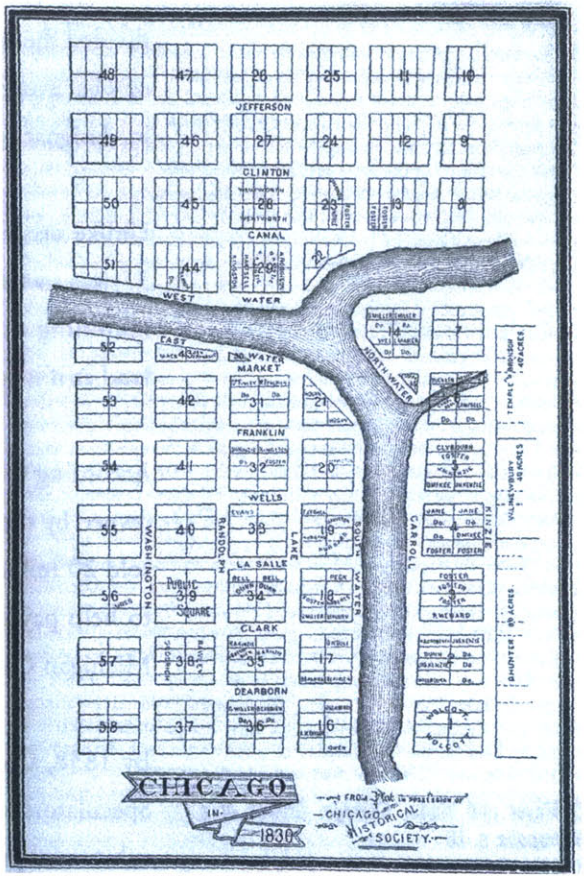

FIG. 8.3. Plat of Chicago - 1830.

Michigan Canal. A corner lot at South Water and Clark streets near Block 37 sold for $3,500 and two years later, was valued at $15,000. Another corner lot at Dearborn and South Water was sold for $9,000 in March 1834 and its value appreciated handsomely by December 1835 to $25,000.[7] In *Chicago: Growth of a Metropolis*, Harold Mayer and Richard Wade noted that Chicago became more of a 'real estate lottery' than it was a community.[8]

Between 1840 and 1871, Block 37 was built up completely, comprising of homes, offices, businesses, a hotel, the Masonic Temple, and even theaters including the Crosby Opera House, the most prominent building on the block. The Crosby Opera House established Block 37 as an entertainment center for the city[9], a sentiment that survived the fire in 1871, the buildings' demolition in 1989, and lives on even as the lot sits vacant today.

The Great Fire of 1871 'reset' the land values of the Loop and Chicago. All the buildings on Block 37 are part of the 17,450 of the city's 60,000 buildings destroyed in the fire. Tripling land values[10] permanently ostracized residential programs, and small plots of land were combined and therefore laid the groundwork for the emergence of the tall building in an accelerated real estate market.

Cyrus McCormick, an inventor who revolutionized agriculture with his McCormick reaper, hired architect John van Osdel in 1873 to build the largest building van Osdel could on the corner of Dearborn and Randolph. This site had been owned by McCormick earlier and he had leased it for the typical 99 years, but after the Great Fire, he built a five-story masonry office building to house clerical and executive offices for his manufacturing company. After making a second fortune by such 'farming' Chicago's downtown land, Cyrus McCormick died in 1884.[11] His heir,

7. Miller, Ross. p. 207
8. Mayer and Wade. p. 18
9. Miller, Ross. p. 208
10. According to Miller (p. 209), the Dearborn Street side of Block 37, leased on average of $300 per front foot a decade before the fire, and $1000 two years after. By 1928, values had reached their pre-Depression peak of $23,000, a level not to be reached again until the 1980s.
11. Miller, Ross. p. 212

FIG. 8.4. Unity Building with ComEd substation on right.

FIG. 8.5. McCarthy Building on the corner of Dearborn and Washington Streets in 1980. John van Osdel (1872).

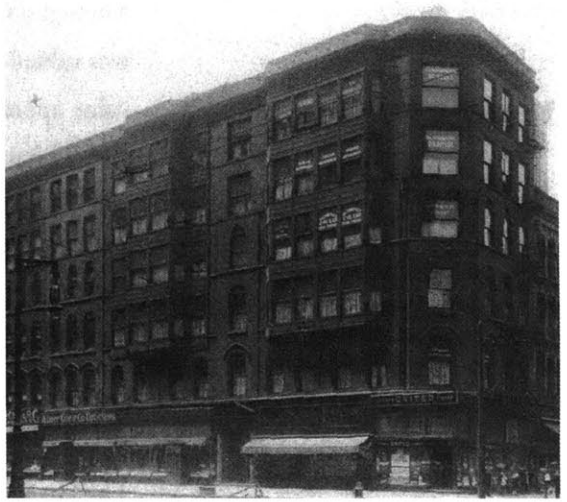

FIG. 8.6. Springer Block circa 1900. Peter B. Wight (1872).

FIG. 8.7. Block 37 on State Street.

Leander McCormick, asked architect C.J. Warren to design an 11-story office tower to replace the earlier building. Prior to construction, their property increased in value so dramatically after simply announcing the plans for the tower, that Leander McCormick decided in 1891 not to build anything, and to eliminate any risk by simply selling the adjacent property for a major profit to Illinois governor John Peter Altgeld. Altgeld then hired Warren to design the 17-story Unity Building on Dearborn Street. After land values crashed in 1893, Altgeld went bankrupt, but the Unity Building remained until 1989.[12]

In 1872, the five-story McCarthy Building and six-story Springer Block were built on the southwest and northeast corners of Block 37, respectively. Two of the oldest buildings in Chicago, the Springer Block designed by Peter B. Wight and renovated by Adler and Sullivan in 1888, would be the first building demolished in 1989. The McCarthy Building by John van Osdel, would over a century later prove to be very significant as the last stronghold preventing the construction of a Helmut Jahn designed, twin-tower post-Modern scheme in 1989.

Block 37 continued to lead an active yet generic existence in Chicago's downtown. It reached its economic peak after World War II, as its retail shops catered to Chicago's impoverished and segregated African-American population. Stores like Hillman's and Stop 'n Shop were parasitically dependent on high-end, major retailers like Marshall Field's across the street, and Carson Pirie Scott designed by Louis Sullivan only one block away, drawing only bargain hunters who couldn't afford the department stores' 300 percent markups.[13] This undercutting would eventually force Marshall Field's to open a new store on North Michigan Avenue at Water Tower Place, close Sears Roebuck, and made it very difficult for Carson Pirie Scott to conduct premium businesses. In addition to retailers, pool

12. Miller, Ross. p. 213-214
13. Miller, Ross. p. 200

FIG. 8.8. North on State from Madison - early 1940s.

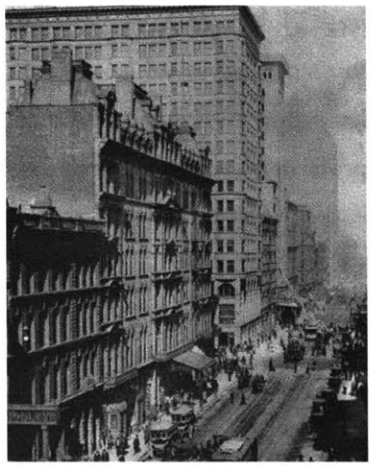

FIG. 8.9. East on Randolph Street - 1892.

FIG. 8.10. Looking south on Dearborn Street from Randolph Street circa 1905.

FIG. 8.11. State Street from Lake Street - 1906.

FIG. 8.12. United Artists Theater and Block 37.

FIG. 8.13. Looking north on Dearborn Street from Madison Street - 1935.

halls on Randolph Street were home to hustlers and gamblers, zoot suits were sold on State Street, coin dealers filled Washington Street, and Mayor's Row, where lawyers held temporary offices and sometimes made illegal deals with judges, found itself on Dearborn Street. The Roosevelt Theater and United Artists Theater had shows ranging from vaudeville to pornography. Chicago's New Year's celebration took place on the State Street side of the block. Sandwiched between City Hall and the retail on State Street, Block 37's identity has always been mixed and ambiguous, at best.

Ambiguity also trickles down into the relationships between the handful of people who were involved in displacing the hundreds, if not thousands, of people on Block 37. Whether it was significant financial or political power, it was a marriage doomed from the onset as both sides had very specific agendas, each competing in importance with the other.

Coincidental with the deterioration of the city, Mayor Richard J. Daley took office in 1955 and would serve for six-terms until his death on December 20, 1976. Daley developed an obsession with the appearance of the city that coincided with contemporary ideas of urban renewal. Exercising his power as a big city mayor, Daley used the Modernist skyscraper and its vast and vacant plazas as a way to combat urban 'blight,' which he perceived as a threat to his administration.

Having forced the city's impoverished neighborhoods out of the downtown and into public housing, and building expressways that would bring the middle and upper classes back to the city, Daley's commissioners advised him in

FIG. 8.14. Richard J. Daley with William Hartmann of SOM in background.

FIG. 8.15. 69 West Washington Street (formerly Brunswick Building), Skidmore, Owings and Merrill (1965).

FIG. 8.16. Richard J. Daley Center, C.F. Murphy and Associates (1965).

1958 to build a new high-rise civic center, serving as a catalyst for rehabilitation and new construction downtown. In a seemingly effortless manner, the city used 'eminent domain' rights and condemned all the property on the block bounded to the west by City Hall and the east by Block 37. The Civic Center, later rededicated as the Richard J. Daley Center, was completed in 1965. Designed by C.F. Murphy and Associates, the cor-ten steel building sat off-centered in a vast granite plaza, ornamented only by a Picasso statue. This offset arrangement would open a window from Daley's office directly to the 'blight' on Block 37.

Along with the Mies van der Rohe designed Federal Plaza[14] the Daley Center served as a catalyst by using a publicly-funded skyscraper to artificially raise land values downtown to encourage skyscraper construction. These plans created an opportunity for local developer Arthur Rubloff to build the city's first speculative office building since the Depression.[15] The 37-story, concrete framed Brunswick Building, now owned by Cook County and known by its address of 69 West Washington Street[16], was also completed in 1965 and sits directly south of the Daley Center. Designed by Skidmore, Owings, and Merrill, it unexpectedly leased for a much higher rent than the land downtown had ever produced.[17] This was fortunate for Rubloff, who had previously never built a single building, and owned only a small property on Chicago's North Michigan Avenue. Rubloff, who had a notorious reputation for exaggeration and twisting the truth for his own self-interest, renamed North Michigan Avenue 'The Magnificent Mile' in 1940 to promote land values around his property. The name remains to this day.

At his worst, Rubloff convinced investors to demolish the historic Chicago Masonic Temple – on the northeast corner of the intersection of State and Randolph streets – by claiming that its light court and age made the building

14. Federal Plaza was designed in 1959 and completed in 1975. The two tower scheme dedicated one tower as a courthouse and the other as an office building. A one-story pavilion-like building completed the composition and serves as a Post Office.
15. Miller, Ross. p. 22
16. *Chicago Tribune*, p. 1
17. The unsprinklered 69 West Washington Street caught fire at 5PM on Friday, October 17, 2003. According to the *Chicago Sun-Times*, fifteen ambulances were called well after the fire was out when several unconscious victims were discovered in the stairwell closest to the fire. Later found to be the fault of a malfunctioning light fixture on the 12th floor, combined with malfunctioning air pressurization systems, automated unlocking devices for stairwell doors, and emergency phones, five people died.

FIG. 8.17. First National Bank, C.F. Murphy and Associates (1969).

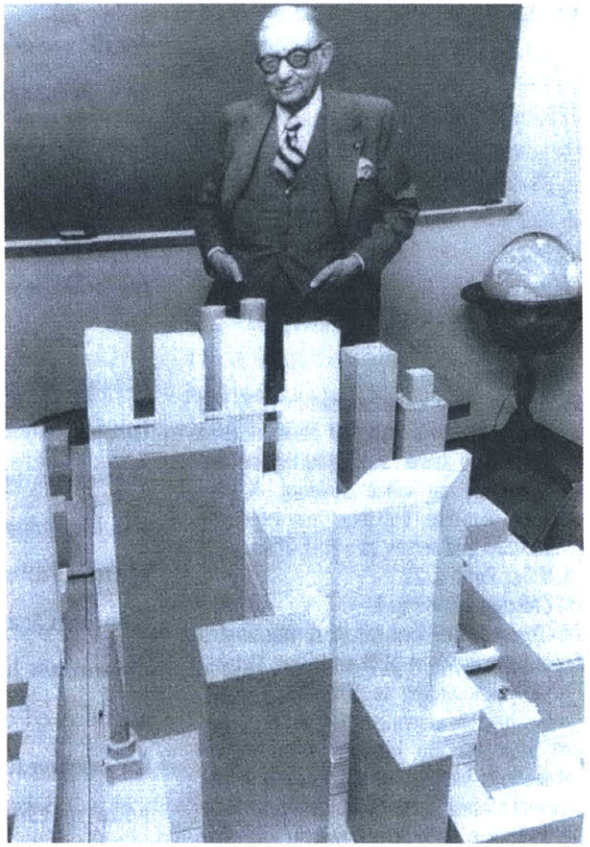

FIG. 8.18. Arthur Rubloff standing over model of proposed North Loop Redevelopment Project.

financially obsolete. He replaced it with what he called a 'tax-payer' – a temporary two-story retail building that would generate enough money from rent to pay its own property tax, until economic conditions made a high-rise a viable financial option. About forty years later, it still stands today, visible from Block 37 with windows and doors boarded up. Eventually, Rubloff's own politics (and insecurities) along with those of Mayor Daley would lead to both of their downfalls.

With the growing success of his plan for urban renewal, Daley's confidence grew. He had successfully courted Rubloff, and ultimately would use Rubloff's skills as a developer to further his own political interests. When Daley learned of First National Bank's plans on building a 60-story tower downtown, he quickly assisted in acquiring the land necessary, simply trading some of the city's land verbally over the phone[18], and allowing construction without proper building permits. According to Miller, it is this confidence that he gains from the First National Bank tower (completed in 1969) that eventually leads to Daley's false sense of omnipotence, and his downfall.

Attempting to expand upon his urban renewal efforts, Daley formed the North Loop Redevelopment Project. Essentially, this plan would have called for the simultaneous demolition of 27 acres of downtown land – 7 entire city blocks with more than 50 functional buildings, including Block 37.[19] Turning to Rubloff, Daley allowed him to develop a master plan with Perkins and Will, while Daley never signed any agreements or made any written commitments to Rubloff. Rubloff would expectedly begin promoting the North Loop Redevelopment Project, assuming the city would take all the land by 'eminent domain,' while Daley sat back and watched.

18. Miller, Ross. p. 30
19. Miller, Ross. p. 62

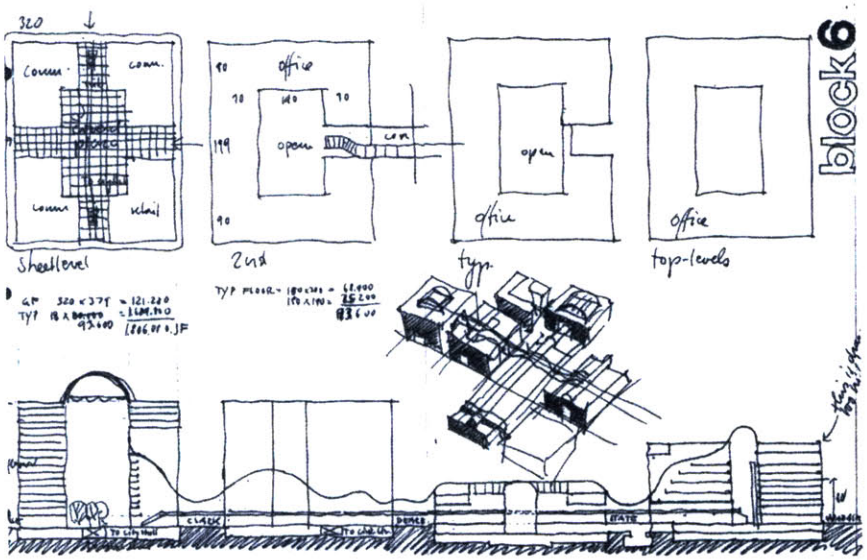

FIG. 8.19 Helmut Jahn preliminary sketch for North Loop Redevelopment Project.

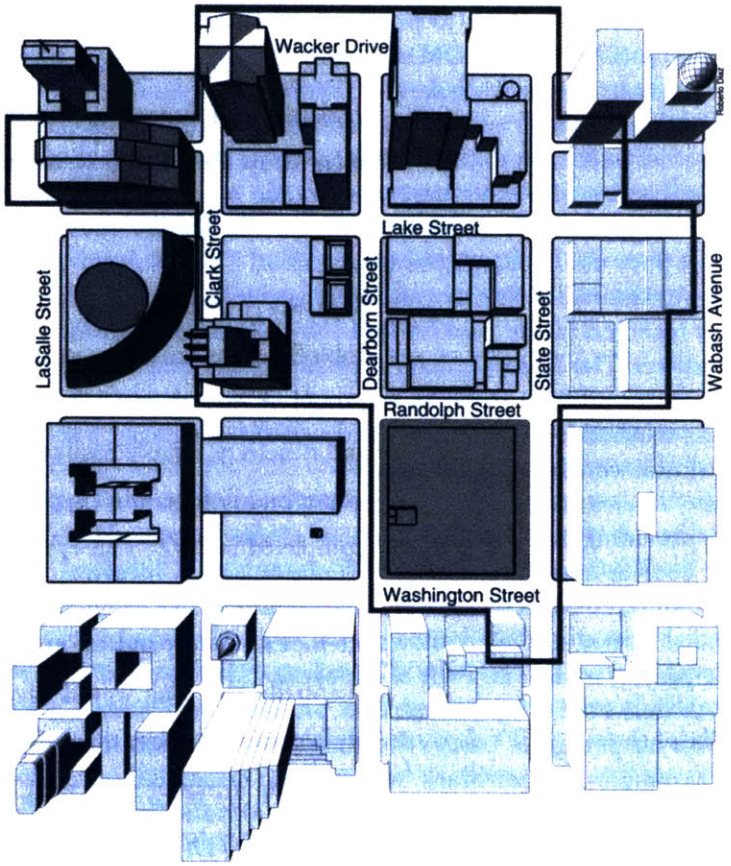

FIG. 8.20. North Loop Redevelopment District.

Richard J. Daley would never see any progress on the redevelopment of the North Loop; he passed away during his sixth term in December 1976. Michael Bilandic would succeed Daley until 1979, when reformist Mayor Jane Byrne took office. During that time, Rubloff continued promoting the North Loop project without any legitimate approval from the city. Eventually, Perkins and Will were fired and Rubloff hired Helmut Jahn to make 'cosmetic' improvements to the work Perkins and Will had done.

Both the city and Rubloff would continue working on the North Loop, both thinking that they had the upper-hand in the disjointed 'relationship.' This is best illustrated by Rubloff's courting of executives from the Hilton hotel chain. Hilton had expressed interest in occupying a significant amount of space for a hotel and convention center within the North Loop area. On May 1, 1978, Rubloff sent a letter to Gregory Dillon, a Hilton executive, stating that the city would offer a generous tax abatement, while Rubloff, according to Miller, knew full well that tax abatements originate with the county and are nearly impossible to get approved.

After the abatement, Rubloff's offer was rejected as might be expected, and Hilton withdrew from the North Loop. Rubloff began to realize that the city had no intention of allowing him to move forward and was using him further, so he reluctantly withdrew from the North Loop project altogether.

Mayor Byrne, who was elected on a platform of reforming the big-city politics of the former Daley administration, thought she could finish what Rubloff had started. However, already embedded in the master plan were a series of Rubloff's secret "side deals" and empty promises that would prevent anything from ever happening in the North Loop.

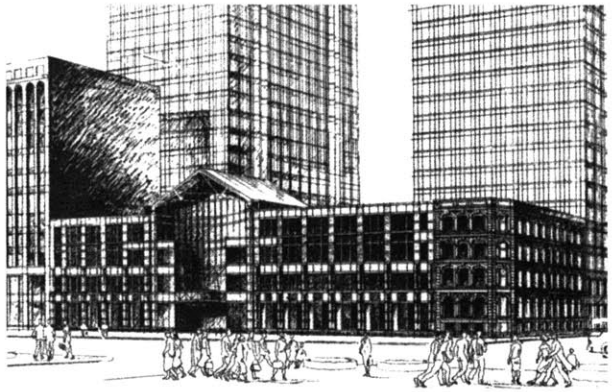

FIG. 8.21. First Helmut Jahn scheme for FJV.

FIG. 8.22 Lawrence Levy.

FIG 8.23. Bruce Graham.

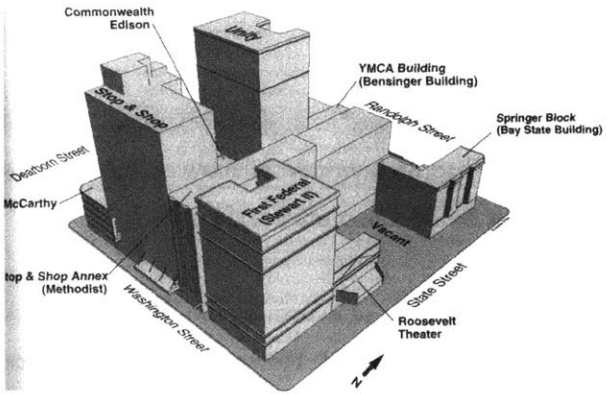

FIG. 8.24. Diagram of Block 37 during condemnation.

FIG. 8.25. FJV Partners from left - Stuart Nathan, Michael Tobin, and Lawrence Levy - standing in front of Block 37 prior to demolition in 1989.

Bruce Graham, then head of Skidmore Owings and Merrill, was eventually brought in by Byrne's administration to continue working on the North Loop. Graham was quickly pressured by Mayor Byrne to draw up a design and to present it publicly. His new scheme included a series of pedestrian bridges and subterranean tunnels. This was the last time anyone would consider redeveloping the North Loop simultaneously together with the city's government, as what came to be called the 'Mole Town' scheme was publicly rejected. Realizing that a potentially lucrative contract was floundering, Graham introduced a client of his – developer Lawrence Levy – to the North Loop area.

Having relatively recently found success in real estate development with his mixed-use One Mag Mile at the corner of Oak Street and North Michigan Avenue, Levy was now in the market, searching for a way to expand his new found fortune.[20] Since Graham had given him inside information on the North Loop area, Levy could now continue investigating without Graham. In January of 1981, Levy focused on Block 37, and more specifically, on the North Loop's large, centrally located Stop 'n Shop property, a property that, if acquired, would allow him to influence any future development on the block.

However, others had the same idea as Levy and had already been acquiring other property on the block. Eventually, the Block F Joint Venture (FJV)[21] was formed in 1982 including Levy, along with developers Neil Bluhm with Barney Weissbourd, and Stuart Nathan. As FJV was formed, Bruce Graham was fired. Graham and Weissbourd had fallen out after a recent argument over another unrelated project. Ironically, Graham's introduction of Levy to the North Loop area – in order to preserve his own role – backfired completely.

20. Miller, Ross. p. 101
21. Block 37 was renamed several times by developers in an effort to psychologically gain control over the block. Block F was the name of Block 37 at the time FJV was formed.

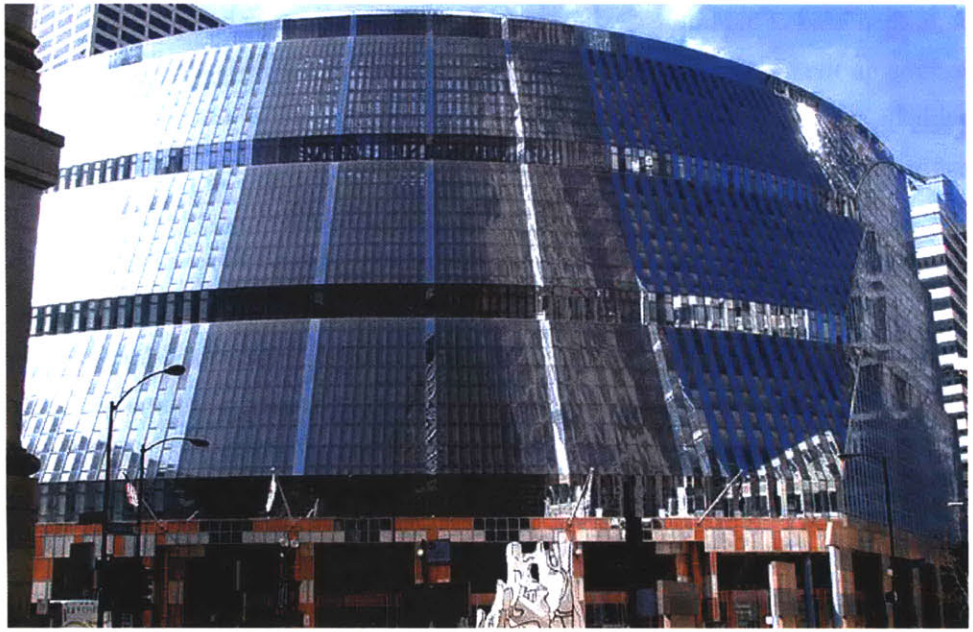

FIG. 8.26. James Thompson Center, Murphy/Jahn (1984).

FIG 8.27. Helmut Jahn.

In 1981, Illinois Governor James Thompson commissioned Helmut Jahn to design the State of Illinois Center – a spaceship-like glass building to house the offices of the state government near the North Loop Redevelopment District. In a market where tenants were scarce and office space was plentiful, FJV was seeking a design for the Block F Joint Venture that would set them apart from other projects. Despite the State of Illinois Center's cost rising $100 million over budget and inadequate air-conditioning systems, FJV hired Jahn to replace Graham. Jahn would complete $9 million of 'paper architecture,' gradually moving from circular twin towers to more conservative and boxier office buildings. In the meantime, a recession loomed, and FJV moved to acquire all of the property on Block 37.

Acquisition was much more difficult than Levy and FJV had originally thought. Despite Richard J. Daley's characterizing Block 37 (and the North Loop area) as 'blighted' in an effort to lower land values and more easily condemn the property, enough time had passed that word spread of the plans. This, in effect, created a spike in land values, similar to the time when the McCormick's were considering construction on the very same block almost a century earlier. FJV bought several of the businesses on Block 37 including Hillman's and Stop 'n Shop, and eventually acquired all the property on the block, with some still owned by the original families like the McCarthys and McCormicks.

But acquisition wasn't the end for FJV. In a city that had just recently lost the Louis Sullivan-designed Chicago Stock Exchange in 1972, preservationists quickly moved to preserve the buildings on Block 37. Despite the existence of the McCarthy Building on the southwest corner designed by Daniel Burnham and John van Osdel's McCarthy and

FIG. 8.28. Block 37 demolition - 1989.

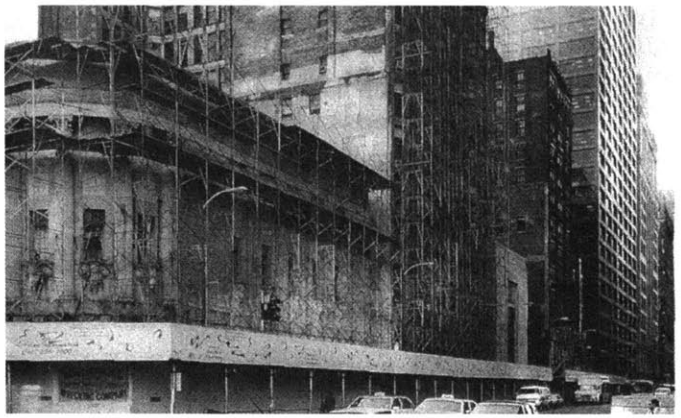

FIG. 8.29. Demolition of Block 37 - 1989.

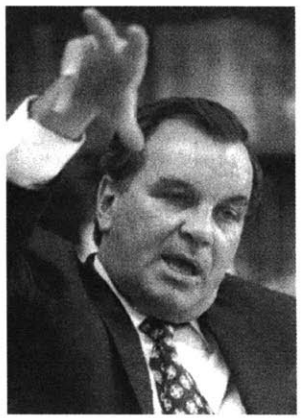

FIG. 8.30. Richard M. Daley.

McCormick buildings, Miller correctly concedes that the only historical significance of these buildings was their age. "The block was only worth saving at death's door, not for its uniqueness, but for its former typicality: a critical piece of the once dime-a-dozen American downtown. A dodo whose mates were already extinct, the block was finally, unarguably, unique." [22] It can be argued that Block 37 lacked any singular identity that would lend any cultural significance to these buildings. In 1989, Mayor Richard M. Daley finished what his father had started almost 50 years ago and introduced all of the buildings on Block 37 to "Big Mama," the National Wrecking Company's wrecking ball.

Preservationists continued to fight what was a losing battle, until it won a small but later significant victory when the McCarthy Building was locked up in lawsuits and could not be demolished. At the time, the LaSalle Bank was considering a move into the Helmut Jahn-designed twin towers, but the slight delay in the demolition of the McCarthy Building forced LaSalle to look elsewhere, and FJV was left with a vacant lot, no tenants, and a recession.

In the midst of the recession, FJV borrowed $64 million for taxes, architectural fees, demolition, and interest – expenses not including the estimated hundreds of millions that would be necessary for construction. With interest rates at 10%, and property taxes for Block 37 at $1 million a year, it cost FJV as much as $7 million annually to fund a vacant lot. [23] Including engineering, legal, and architectural fees, their losses would in the end near $50 million.[24]

22. Miller, Ross. p. 223
23. Miller, Ross. p. 229
24. Miller, Ross. p. 238

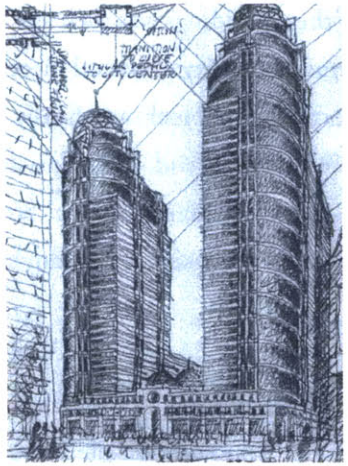

FIG. 8.31. Helmut Jahn sketches -1987.

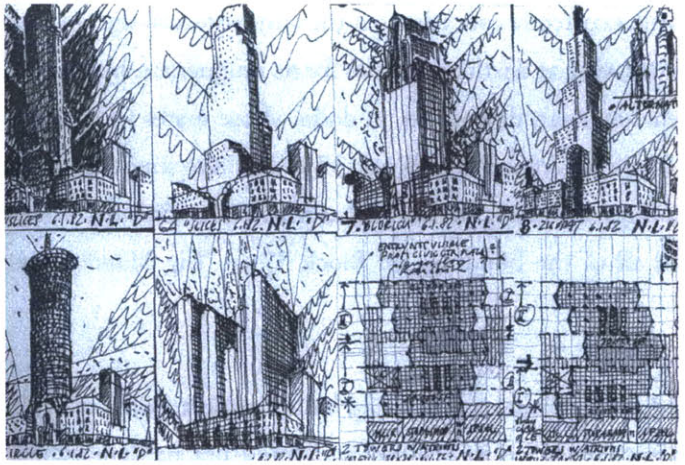

FIG. 8.32. Helmut Jahn sketches for Block 37 - 1982.

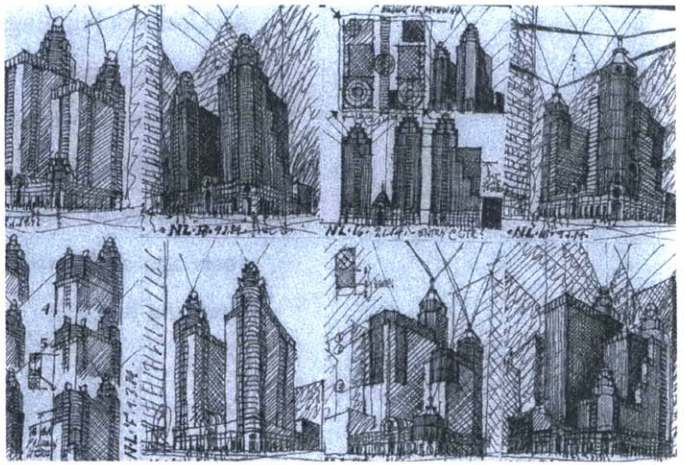

FIG. 8.33. Helmut Jahn sketches for Block 37 - 1984.

FIG. 8.34. Murphy/Jahn, 1989.

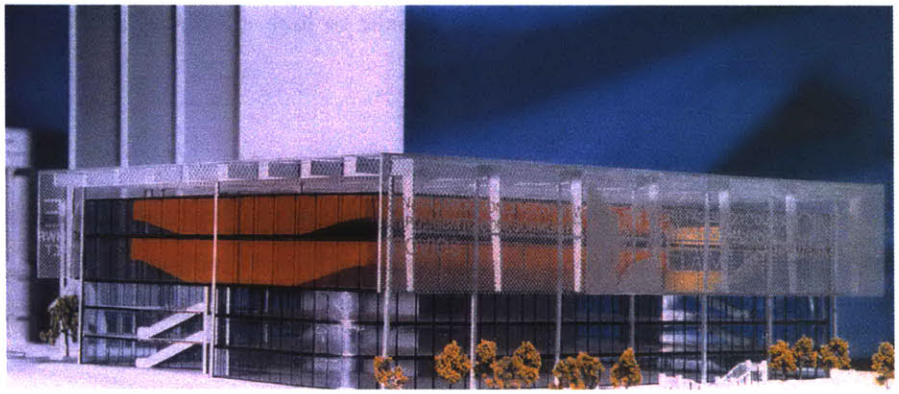

FIG. 8.35. Murphy/Jahn, 1997.

FIG. 8.36. Murphy/Jahn, 2001.

Subsequently, Jahn scaled down his plans and proposed a five-story retail mall for FJV. Since Jahn, according to *Chicago Tribune* architecture critic Blair Kamin was too artistically demanding and expensive for what essentially would be a 'tax-payer,' FJV fired Jahn in the late 1990s. The first non-local architect, William Pedersen of Kohn Pedersen Fox (KPF), was then hired by FJV. Pedersen proposed a scheme in 2001. Radically different from Jahn's and Graham's schemes, Pedersen's thin, 39-story tower composed of a 13-story Marriott Hotel and 22-stories of condominiums, returned a residential program to Block 37 for the first time since the Great Chicago Fire of 1871.

However, Kamin criticized the KPF scheme as being too suburban and alien to State Street. A familiar sight in Chicago's other retail district, North Michigan Avenue, is towers set back from the street on tall, windowless retail bases. Water Tower Place and the KPF designed 900 North Michigan Avenue may have been successful vertical shopping malls on Michigan Avenue, but in Kamin's view, had no place on State Street, home to a Burnham-designed Marshall Field's and Reliance Building, and to Sullivan's Carson Pirie Scott. Following even more criticism from former Chicago Sun-Times architecture critic Lee Bey, FJV fired KPF and hired the local associate architect Solomon, Cordwell, and Buenz (SCB). SCB produced an L-shaped 66-story tower scheme on the southwest corner of the block later that year. After the project was scaled back once again, due to the slumping economy, the city cancelled the project and finally opened the site up to other developers.

...

As of this writing, The Mills Group of Virginia currently owns the rights to develop on Block 37. Jahn also returned to Block 37 in 2001, proposing another twin tower scheme – this time with residences – on another retail base. Unlike any of the earlier proposed schemes, Jahn's semi-circular towers are not aligned to any street that marks the

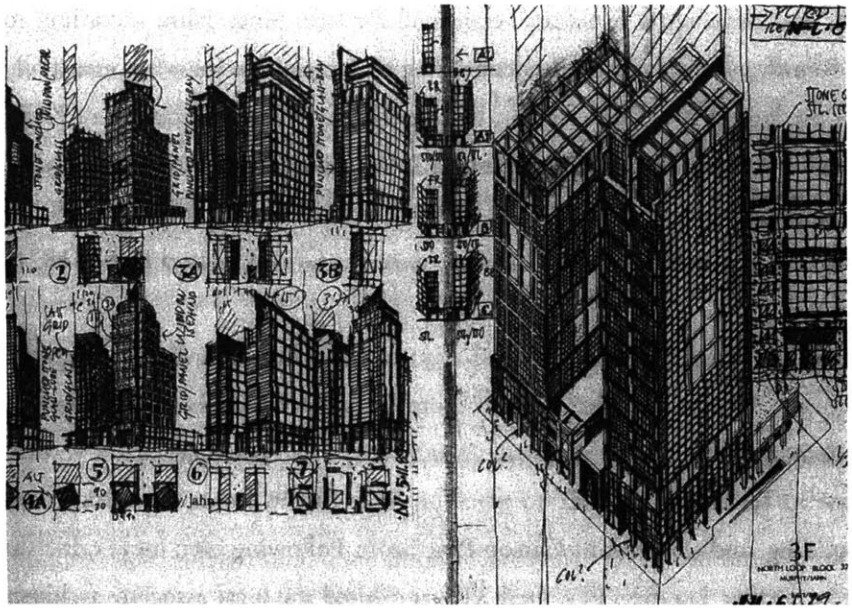

FIG. 8.37. Helmut Jahn sketched proposal - 1989.

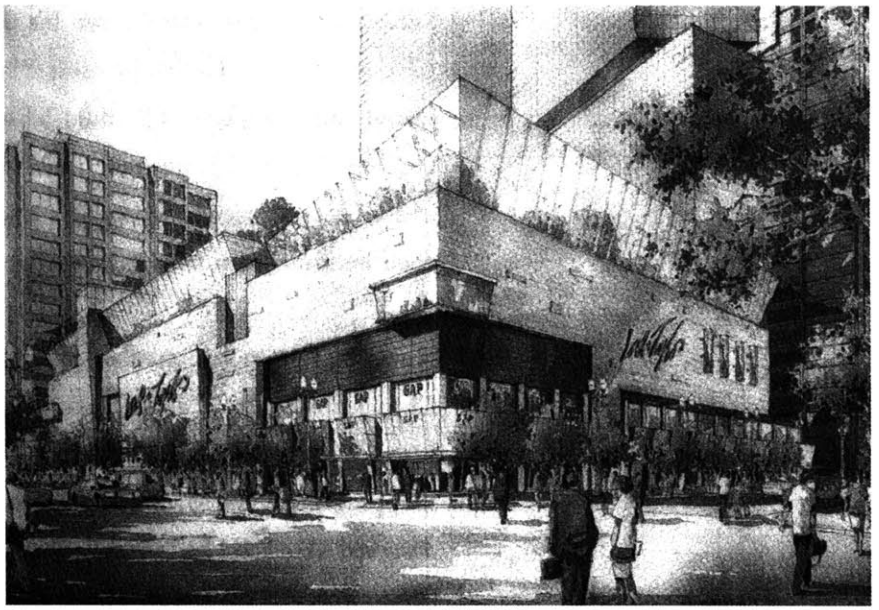

FIG. 8.38. Block 37 proposal by Kohn Pedersen Fox.

perimeter of Block 37, but 'float' in the center divorcing itself from any activity on State Street or Daley Center Plaza.

In the end, the McCarthy Building's last days would have a more historic impact on Chicago than it did in its first 100 years. The slight delay it caused preventing Jahn's post-modern scheme opened the doors for the public to turn one of the only open spaces in Chicago's downtown into a successful public place. With only a carpet of dirt and soft wood chips, Block 37 became Gallery 37 – an artists' workshop for school children teamed up with professional artists who volunteered their time over the summer. In the winter, Gallery 37's tents came down and became 'Skate on State,' Chicago's winter skating rink. Only recently has it found a permanent home in Richard M. Daley's Millenium Park just two blocks away. In addition to these new Chicago traditions, it has served as a stage to numerous concerts, a home to festivals, and even the Marshall Field's Vertical Fashion Show in the summer of 2003, as harnessed models paraded down the facade of the department store. Although Mayor Richard J. Daley described Block 37 as 'blighted,' Miller reiterates that Block 37 was perhaps the most active of blocks in the Loop. To this day, this holds true despite the fact there is nothing there.

Perhaps Block 37 is just a series of paradoxes and bad luck. When Richard J. Daley originally eyed the entire site for condemnation, he was trying to drop the value of the land so a developer (along with the city essentially acting as client) could buy up the land, build a tower, and increase land values in the Loop. However, unlike the ease with which other land was acquired in the Loop, the stubborn Block 37 took well over a decade. In that decade, property values rose dramatically after rumors of developers' plans. In the end, the very property that developers thought

FIG. 8.39. Dedication of Civic Center Plaza with Block 37 in background - 1967.

FIG. 8.40. Gallery 37 tents on a vacant Block 37.

would be worth more than one billion dollars turned into a $50 million debt.

At the risk of oversimplifying the problem, each of the proposed schemes for Block 37 have been economically viable – otherwise, developers would not present such proposals. Aside from untimely fluctuations in the economy, the force that has truly prevented progress at Block 37 is the city, and its inability to acknowledge the inherent value of Block 37 to the public, and therefore an inability to articulate specific requirements to preserve this virtue.[25] Until the public value of Block 37 is acknowledged by government and preserved by private development, it could remain empty for quite some time.

Block 37 has historically always served a diverse public – even as a vacant lot. At its economic peak, it was essentially bisected with Mayor's Row on Dearborn Street, serving the city, and retail on State Street, serving the shopping public. Although Miller and Kamin will both argue that Block 37 has always lacked a singular identity, the reality, as I see it, is that its identity could not be clearer. Emerging within the last decade is the reinvigoration of several Chicago traditions such as Gallery 37 and Skate on State, that were born on the vacant Block 37, and illustrating that a diverse, public interest has an overwhelming claim to Block 37, with or without city politics or private development.

25. According to Philip Castillo who works closely with Helmut Jahn, request for proposals for Block 37 have historically been notoriously vague.

bridging earth and sky *design*

To recall William Pedersen and his definition of a skyscraper that is an aspiration to link earth and sky, the design portion of the thesis attempts to maintain a certain poetic quality about the overall composition and resultant iconography of the skyscraper. This objective is coupled with the previously discussed qualitative elements that define the neighborhood and its communities, as well as the initial mapping study to help define an ordering system. Alone, the neighborhood and mapping studies, although vertically oriented, do not yet fulfill the aspirations that the term "skyscraper" promises. The following series of design issues although categorized here, are endlessly dependent on one and another, influenced at varying degrees by the programmatic needs of the vertical neighborhood and the aspiration that treats the skyscraper as a bridge between earth and sky.

SITE STRATEGY

Based on the site analysis, which revealed a needed connection between the existing Daley Center Plaza and Block 37, it was quickly decided that the portion of Dearborn Street that creates the western boundary of the site should be closed off, linking both public spaces.

To preserve this singular, enlarged plaza, a slab-like structure that rested on the State Street side of the site, that marks the eastern boundary, was ideal for several reasons: first, it allowed a continuous public space in the heart of Chicago's Loop; second, it preserved the space of State Street by completing the void that was created in the "urban street wall" that shaped State Street prior to Block 37's demolition; third, it placed the smaller face of the slab towards the south that would reduce heating loads during the summer; fourth, it maximized views towards Lake Michigan and the rest of the Loop; fifth, it would preserve and strengthen the reading of the Daley Center as a

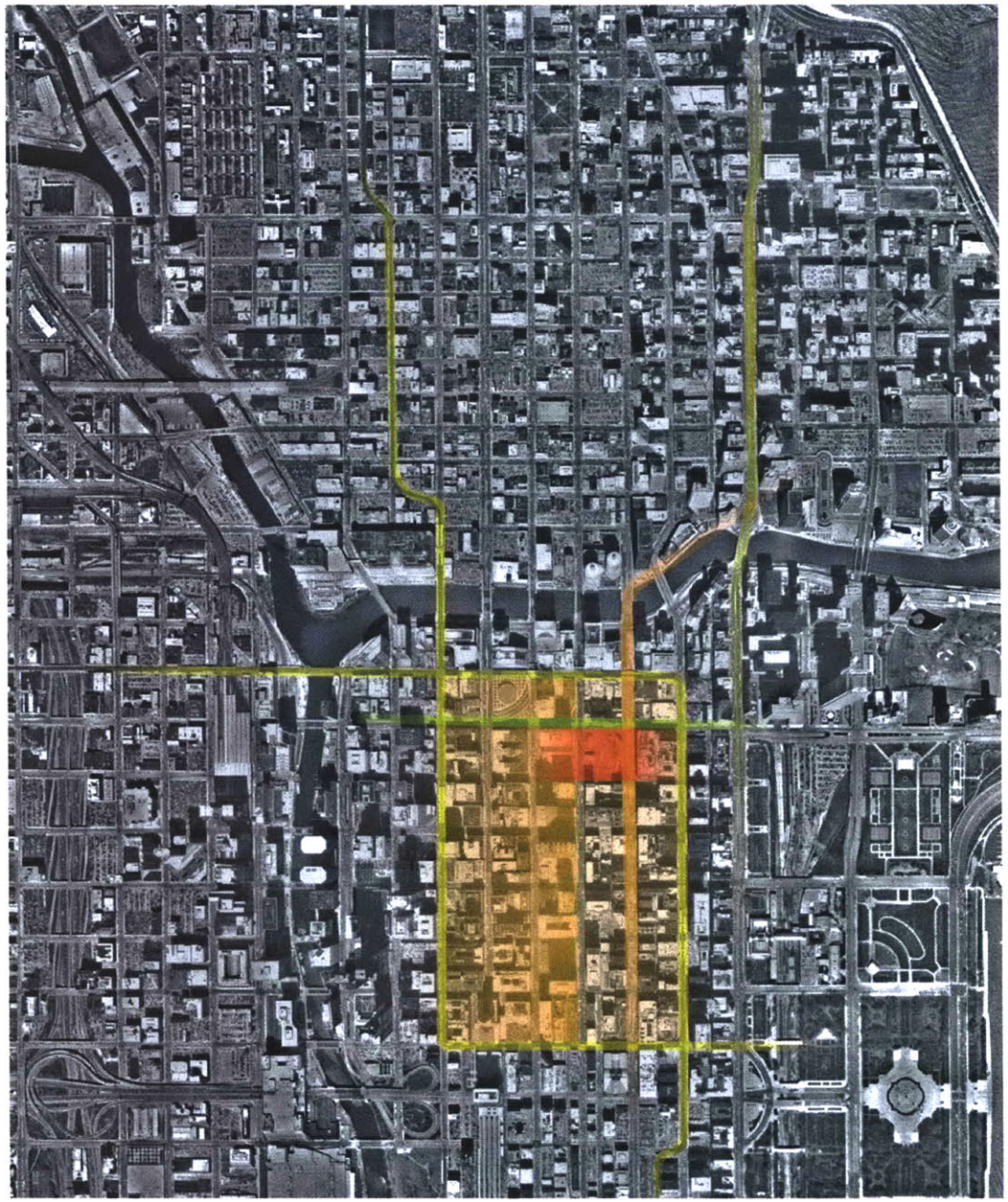

FIG. 9.1. Site analysis. Aerial photo from USGS.

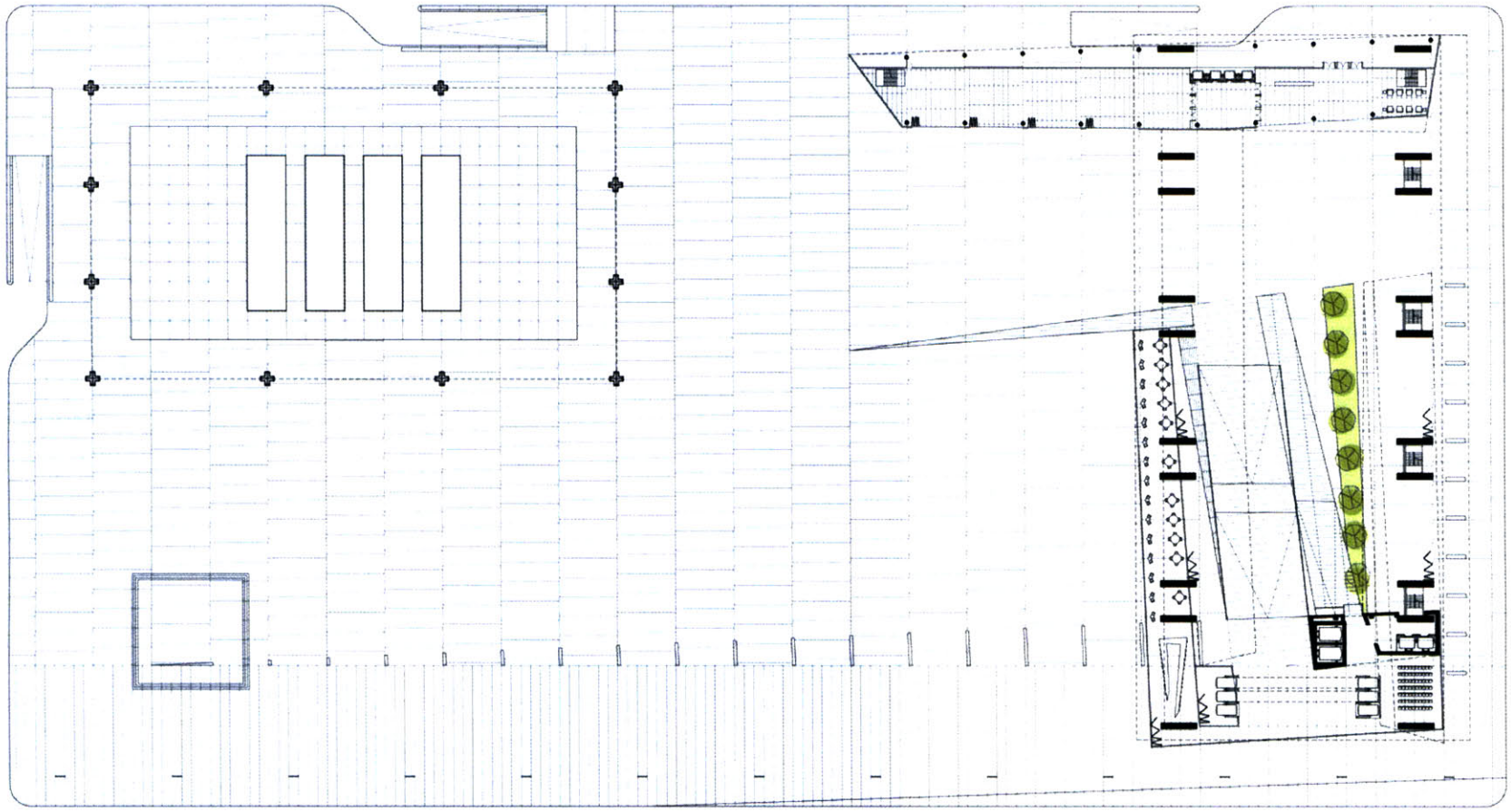

FIG. 9.2. Grade level plan

tower that sits as a sculptural element among a large plaza; sixth, it would once again define the Daley Center Plaza as an urban room; and finally, it maximized the ability for the building to take advantage of prevailing winds that is projected to come from the west. (True prevailing winds come from the southwest during most months, however the 900' tall Bank One Building and Three First National Bank coupled with the existing Daley Center would channel air flow due west.)

At the base of the tower is a small office building with the intention of housing Chicago's CBS affiliate station WBBM-TV Channel 2 including a ground floor news room as per current request for proposals. This 8-story structure would sit along the Randolph Street boundary to the north of the site, and provide a scale moderator between the plaza and the tower. It would also maintain the urban street wall along the new theater district that has returned along the revitalized Randolph Street.

Along the State Street side is primarily openings towards a ramp that invites people towards the vertical street of the tower, but also incorporates above a satellite campus for the Art Institute of Chicago for small artist studios and workshops. At certain times of the year, the ground plane can become artists' workshops for students creating a living "memorial" for Gallery 37. A large art gallery is also included along the State Street side.

The western portion of the skyscraper base is an elevated platform, raised one floor above grade level, that serves as a bar and café. This raised platform can also serve as a stage for large civic events that can take place on the plaza. The intention of the site strategy was most definitely to preserve as much space as possible to the public as it has

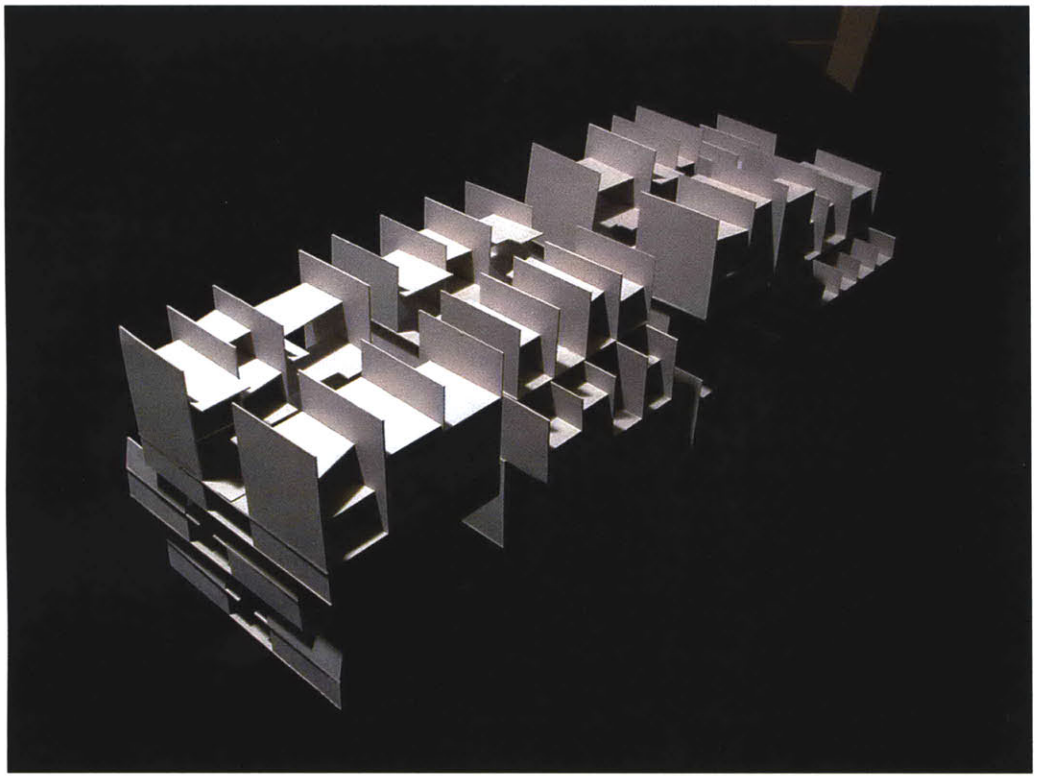

FIG. 9.3. Study model - spatial matrix

proven to be quite valuable land for this purpose, but also to enhance the space while providing a fluid link to the vertical neighborhood by a ramp that is neither inside or outside.

SPATIAL MATRIX: THE DWELLING UNITS

The root of the design portion of this thesis lies in the spatial matrix of dwelling units and the series of semi-public spaces that are associated with them.

The majority of conventional dwelling units remain on one floor, some several thousand square feet in area. This is detrimental to the residential tower as it described earlier, it minimizes the amount of people per floor, thereby grossly minimizing and chance at social interaction within corridors and elevator lobbies. These large area-based units also imply a horizontal orientation geometrically speaking, so at their essence they work against the vertical grain of the skyscraper.

One of the objectives in the spatial matrix is to maximize the amount of people using shared semi-public space in order to increase the chances of social interaction. To do this, while respecting the vertical grain of the skyscraper, a volumetric module was used as base metric for the dwelling unit.

Approximately 32 feet by 13 feet, every standard volumetric module shares the same footprint. This reduces the area configuration to 416 square feet, which allows up to 32 units that exist at practically any horizontal section taken through the tower. This is a vast improvement on the current prototype that on average have only 6-8 units

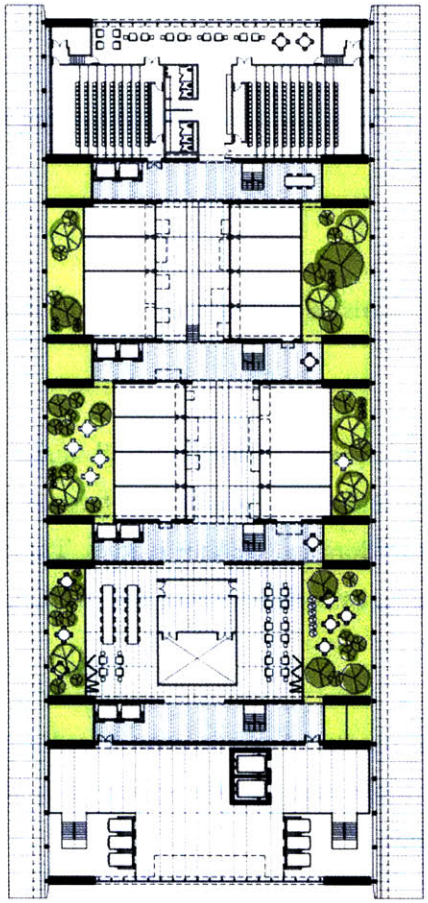

FIG. 9.4. Typical low-rise plan

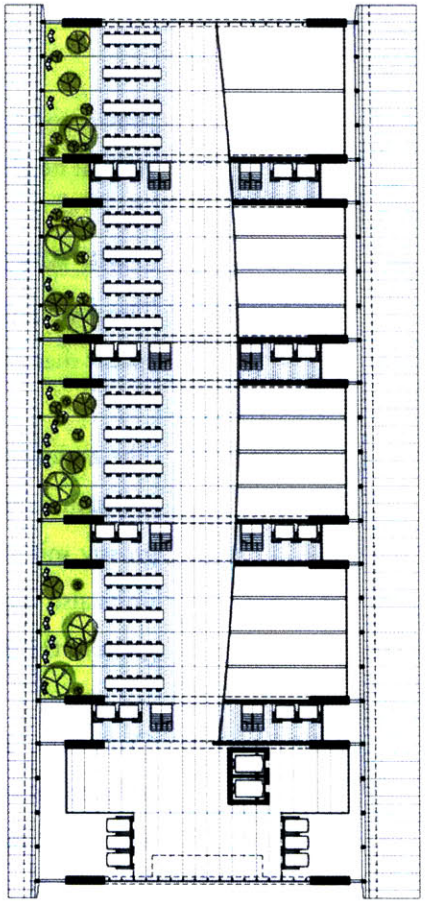

FIG. 9.5. State Street Market plan

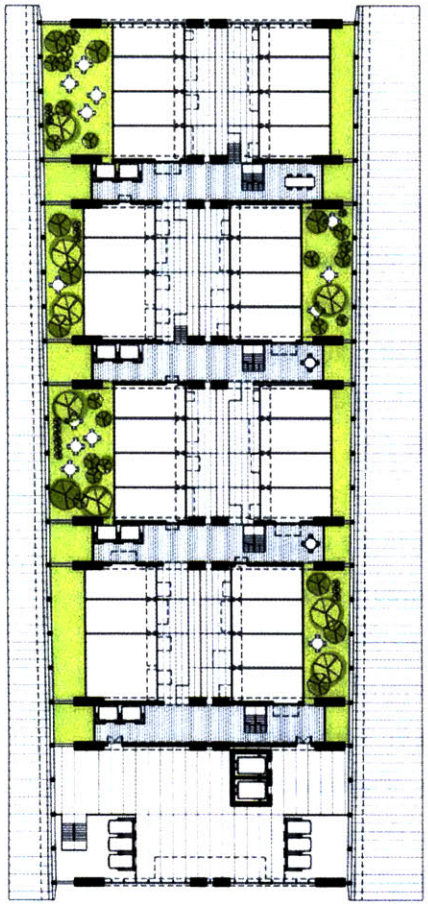

FIG. 9.6. Typical mid-rise plan

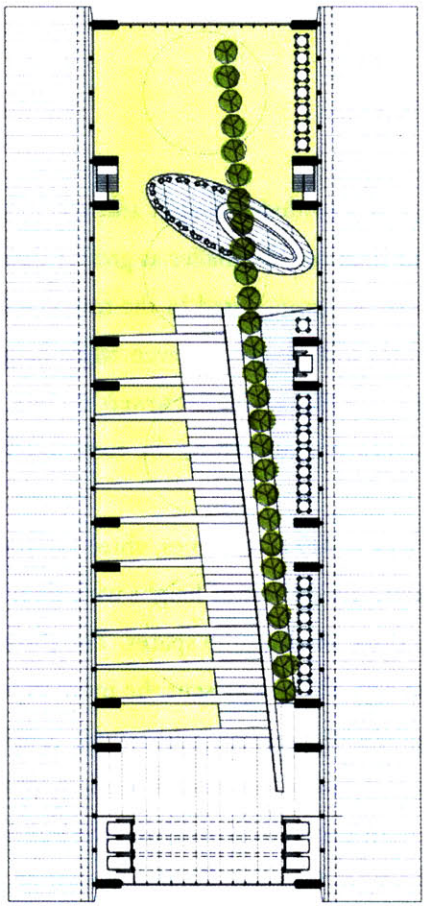

FIG. 9.7. Winter garden plan

per floor.

Additional space is provided in height and volume, and not necessarily area. This is advantageous in several ways: first, overall unit sizes can be smaller as greater floor to ceiling heights provide a large sense of space, and therefore more units can be accommodated in the tower; second, the sale of volumetric space allows residents to customize their own volumes with double or even triple height spaces, lofts, full floors, etc., providing a smaller grain level of flexibility that current residential towers do not; and finally, residents invest in their own spaces which creates a concern and interest in maintaining the communal areas and the well-being of the vertical neighborhood.

To attract a diverse series of incomes, three variations of the volumetric module were used. A three-story version provide approximately 30 feet of height with floor to ceiling glass that can accommodate a two bedroom unit, or be divided into three small studio spaces. The three-story option is aimed towards small families or retired couples returning to the city. These represent the more expensive units in the building. A two-story version aimed at single professionals, graduate students, and young couples provides approximately 20 feet of height again with floor to ceiling glass and can accommodate a one bedroom and office type of configuration. This series of volumetric modules is the most common throughout the building, as market forces dictate one bedroom units as the highest in demand historically in Chicago. Finally, the last unit is a studio space, with only 10 feet of height aimed for college students and those who will be staying for the short term such as visiting scholars, artists, and others. These would also provide a unique alternative to a standard hotel prototype.

In order to foster a community, each of the units are grouped in small clusters of 8 units, with the exception of the short term studio spaces which stack an additional 8 units on top forming a cluster of 16 units. It is intended that those with similar incomes and age ranges are more likely to form a small circle of familiar acquaintances and neighbors, if not friends. The short term is doubled in order to create a catalyst for interaction among short-term residents or a younger population who are more likely to want to interact.

Each unit has two glass facades – one facing the exterior views and another facing a shared semi-public space 25 feet wide herein denoted as a "muse." The term "muse" is borrowed from Frank Duffy who stated that in London, there is a spatial typology where several dwelling units have private outdoor space that forms a single room that is shared by the community only. This is different from a patio or terrace as they connote an individualistic attitude towards the semi-public space.

Each unit purchases the portion of the muse directly outside their unit and can be used as a small garden or patio space on an individual level, but encourages a social interaction among residents when more than one is used. Glass bi-fold doors fold open along the ground floors on all three types of units opening what presumably would be the living space of the unit onto the muse thereby expanding the sense of space. A path down the center of the muse would allow circulation from the vertical streets to the individual dwelling unit.

Although the glass bi-fold doors at the floor of the muse and the operable glass façade facing outwards towards views are not available for customization, the façades of the units facing the muse are. Therefore, small balcony spaces can

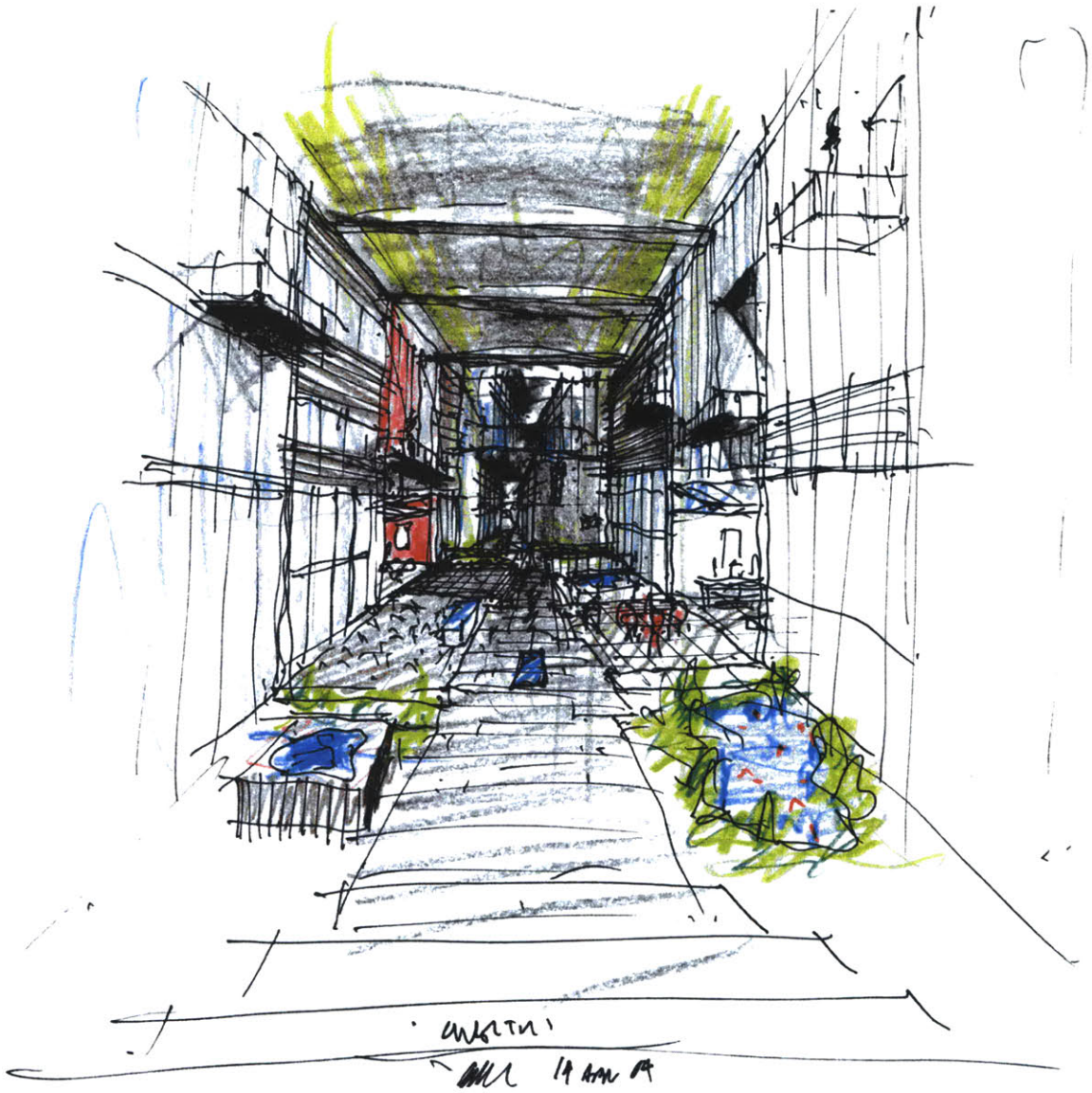

FIG. 9.8. Sketch - typical three-story muse

be added creating another series of spaces above the muse level, allowing residents to interact with each other at a different level not perceivable to those simply passing through the muse.

To borrow from Jacobs, the muse is a highly supervised space as glass facades to private units surround it. This ensures a privacy and safety within this semi-public space and naturally discourages illegal behavior to occur within the muse. The muse is lit with natural daylight collected from the heliostats at the top of the building and fed downward via fiber-optic cables and diffused using solar hybrid light fixtures.

The value of the muse is the spatial character it implies – it provides a reasonable amount of privacy for the cluster of 8 residents. However, in order to accomplish this, each cluster in adjacent bundled towers must be staggered in plan so as to eliminate any corridor effect but to really attempt at enclosing the muse as a small room. This staggering of spaces also occurs in section, which allows for clusters diagonal from each other in section to maintain visual connections among muses, but makes direct physical linkages less obvious. This maintains a kind of cascading visual corridor throughout the entire spatial matrix – connections between various muses – while preserving a sense of privacy from adjacent muses that have direct physical access.

So if eight units form a cluster, each with a muse at its lowest floor, then a series of clusters stacked one on top of the other forms a "block." Each block consists of about 6 clusters. Social interaction in the block is the most difficult as it is synonymous with the residential tower prototype as it exists today: there is no connection between the floors vertically. To ameliorate this, each block of clusters shares a "service module:" a one floor space that includes

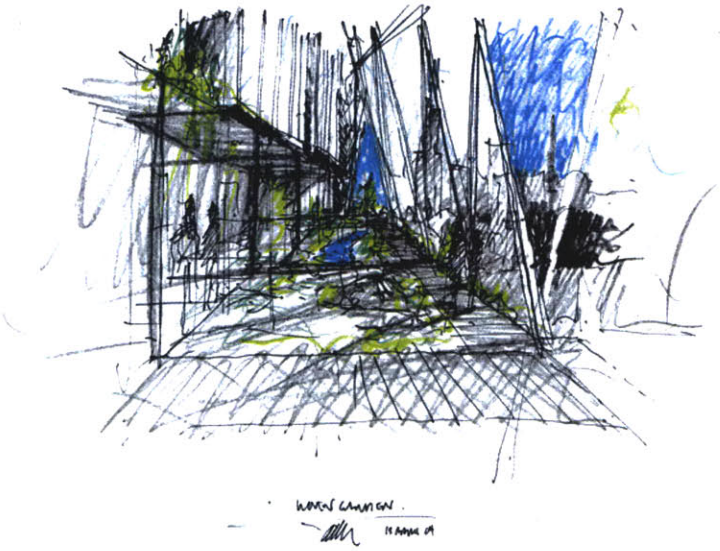

FIG. 9.9. Sketch - interwoven communal garden

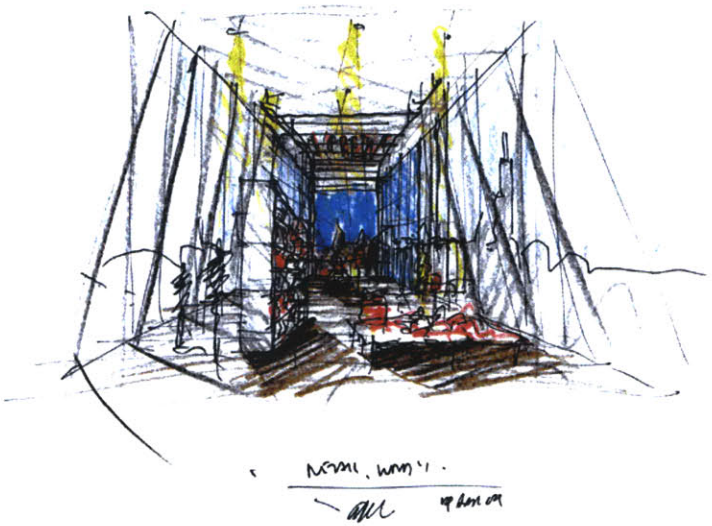

FIG. 9.10. Sketch - retail and elevator lobby hybrid

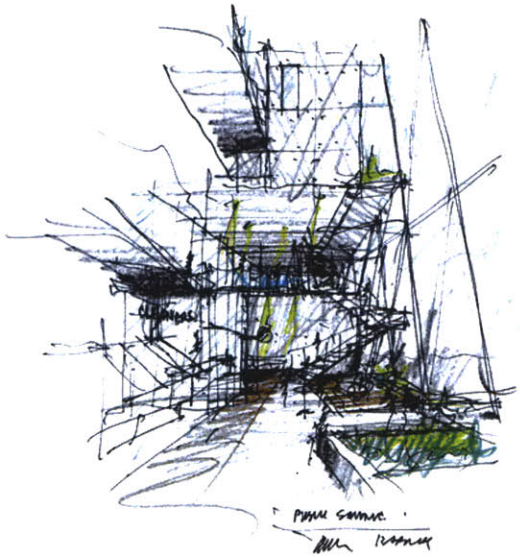

FIG. 9.11. Sketch - public square

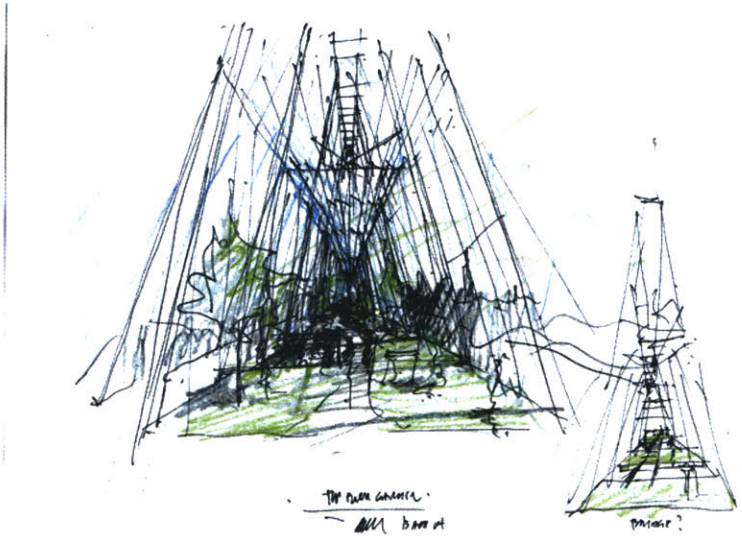

FIG. 9.12. Sketch - Winter garden

mechanical space, assigned additional storage, trash collection, laundry facilities, and the like. Each service module also has communal space available for residents, and determined by the residents. For instance, one block may elect to place a woodshop or artist studio in their space and another may elect to supplement their incomes by leasing out space to a small office. Each service module is directly linked to a semi-public garden, intended to link one service module of a block to another, and aimed at resident use only. These interwoven gardens connect one block from the other and therefore these communal spaces may begin to form their own identities attracting residents from other blocks and vice versa.

The spatial matrix may at first appear to be quite complicated, however the rules for geometric organization are quite simple: maintain the sanctity of the muse space by prohibiting horizontally adjacent muses from having direct visual and physical access that characterizes the conventional corridor, but maintain visual corridors among diagonal muses.

CIRCULATION MATRIX

As a hierarchy of circulation (and public spaces) exist in the successful horizontal neighborhood, so too does it exist in the vertical neighborhood.

MAJOR VERTICAL STREET

The vertical street that connects to the rest of the city is the southernmost member of the five bundled towers. This links directly to the corner of State and Washington streets, and raises the entire length of the skyscraper.

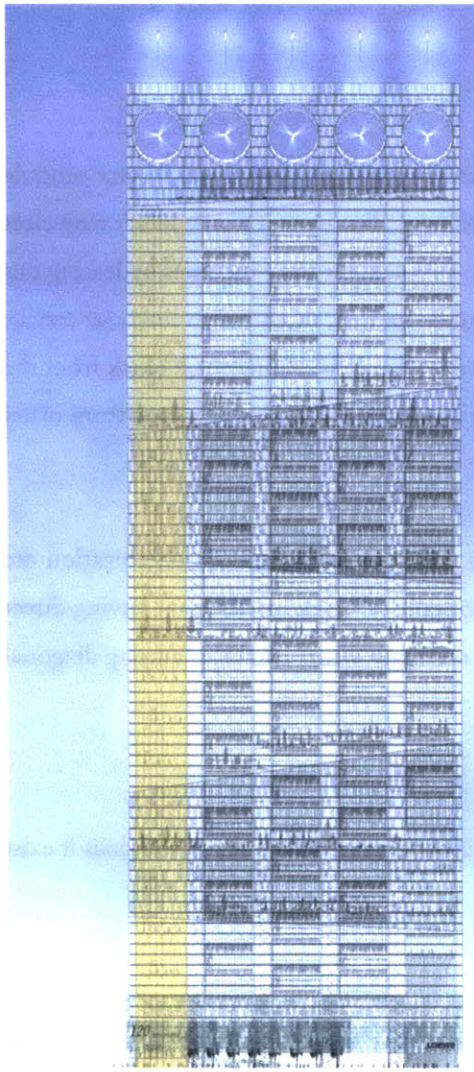

FIG. 9.13. Diagram - major vertical street

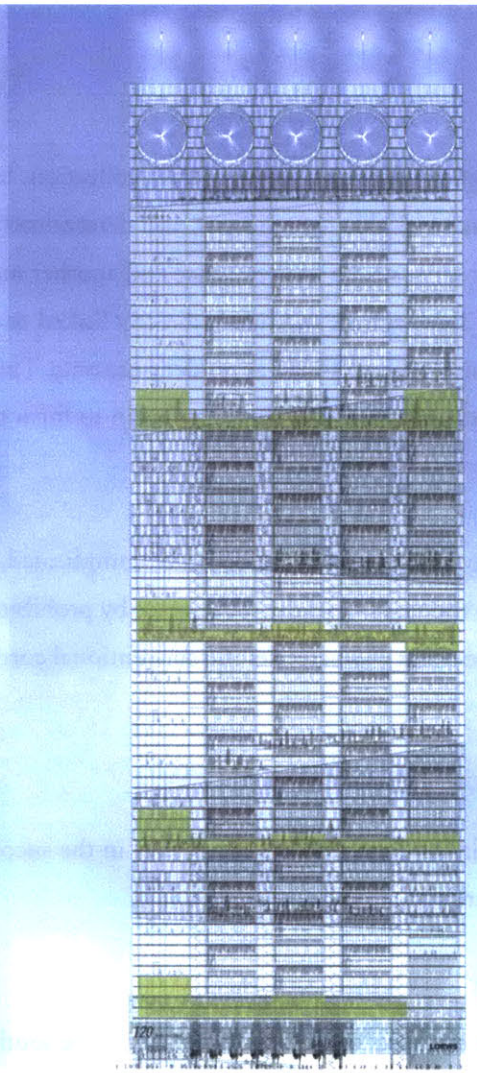

FIG. 9.14. Diagram - horizontal avenues

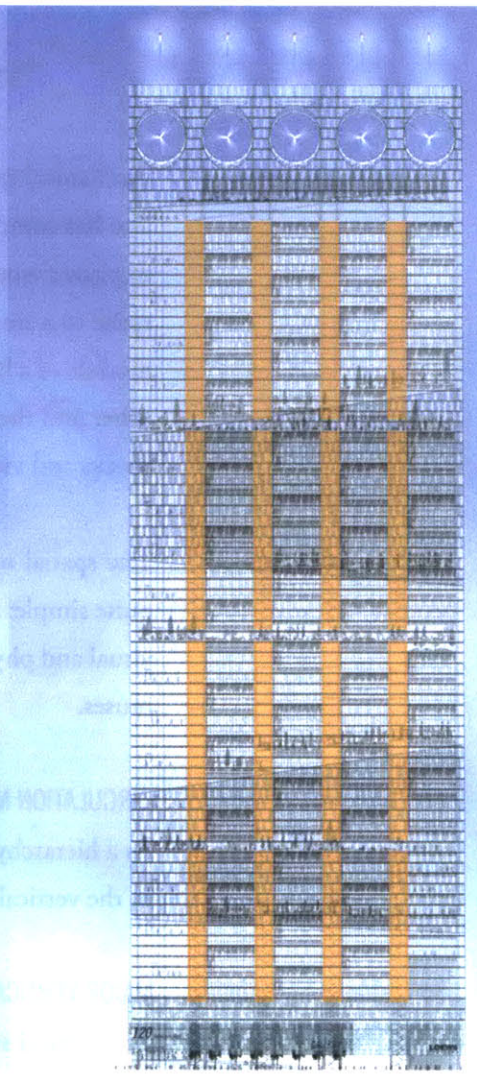

FIG. 9.15. Diagram - minor vertical streets

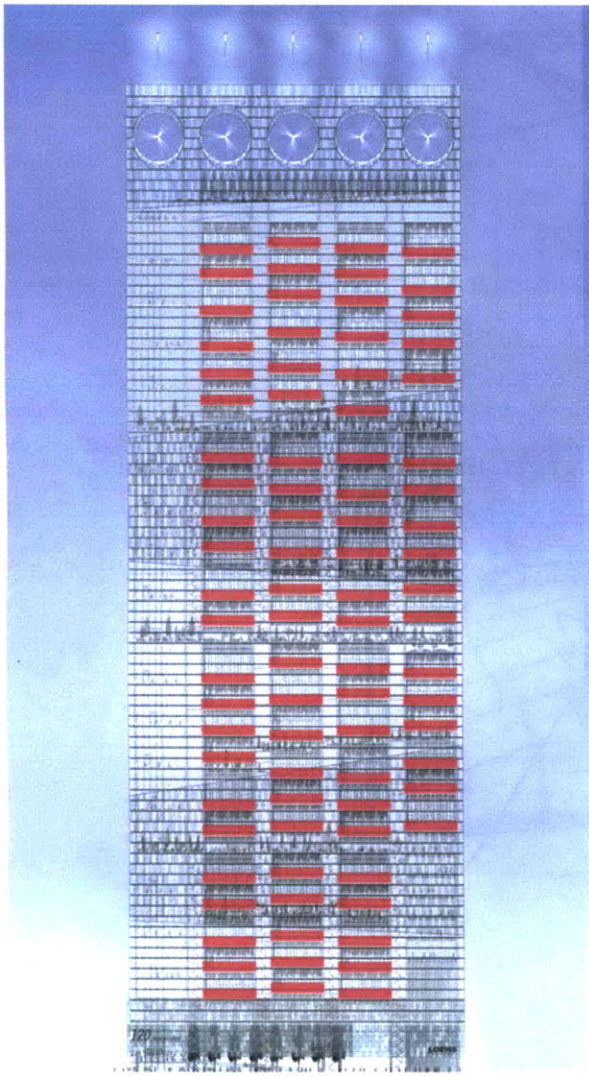

FIG. 9.16. Diagram - muses

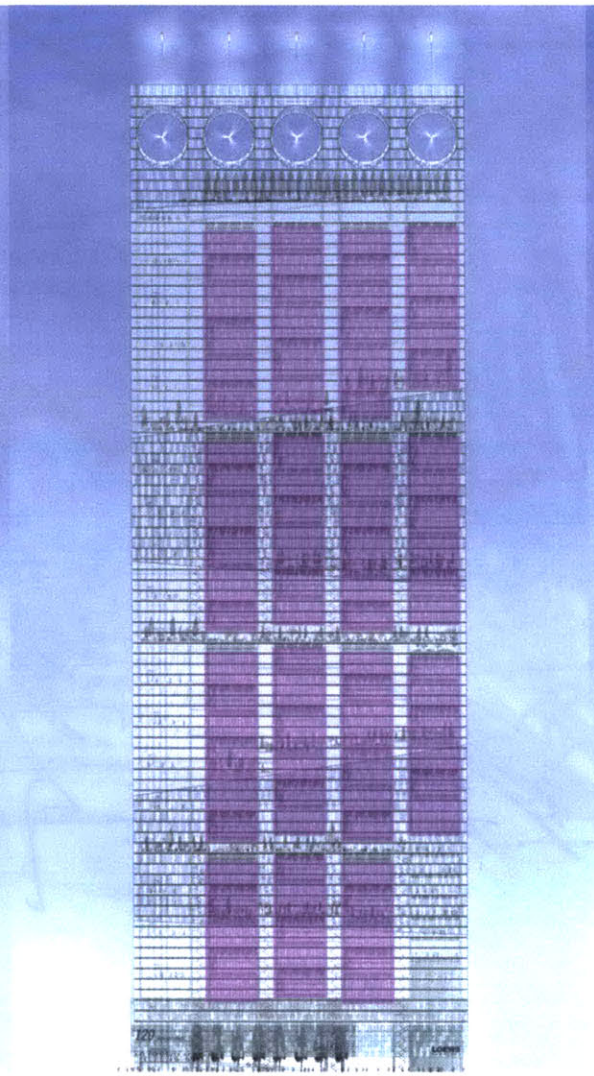

FIG. 9.17. Diagram - blocks of communities

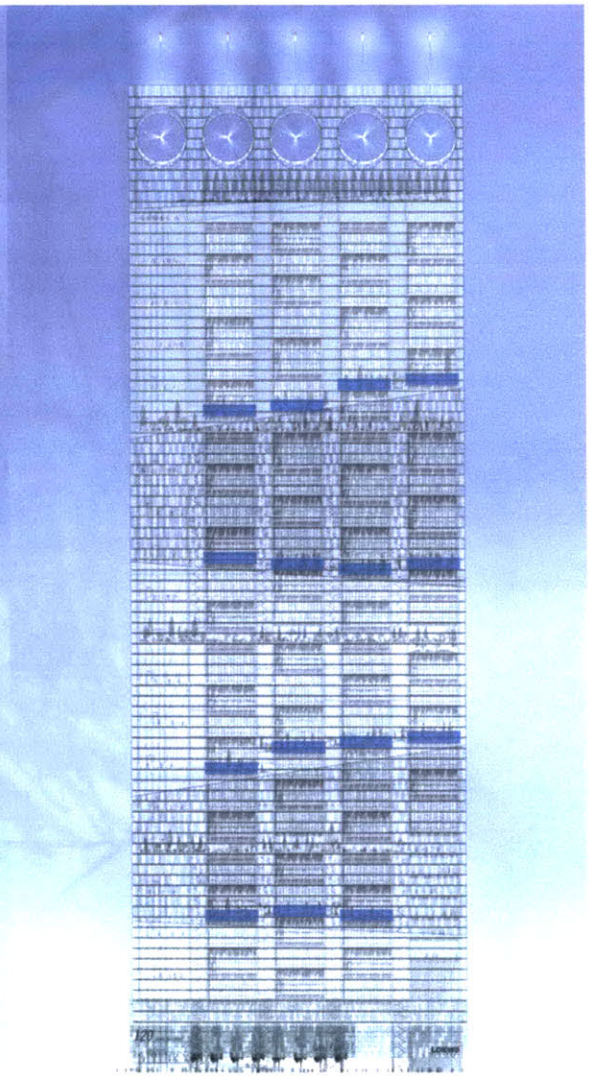

FIG. 9.18. Diagram - service modules and interwoven gardens

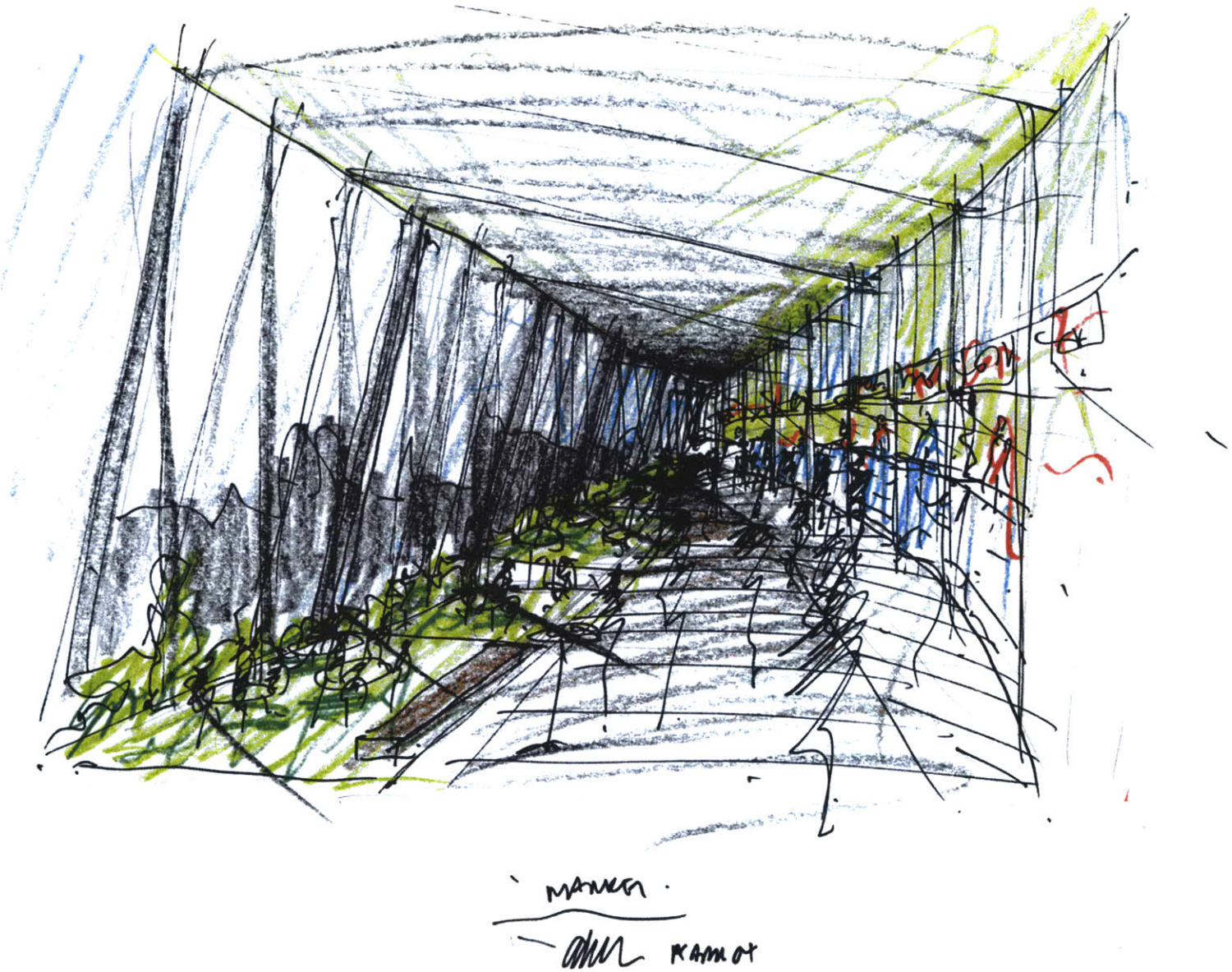

FIG. 9.19. Sketch - State Street Market

The primary innovation here is the use of a hybrid elevator and funicular transportation method. To minimize space needlessly taken up by elevator shafts, this hybrid elevator system uses a looping track that uses only space equivalent to 6 elevator shafts, but since all cabs run clockwise, multiple cabs and run on each loop. In other words, one shaft may have a couple of dozen cabs or so. This translates to using a model of circulation more in tune with a subway system than an elevator with control panel. One of those shafts is a dedicated express loop, where fewer cabs run directly to the horizontal avenues that will be discussed later. The remaining two loops open directly into retail spaces and since the cabs and wall systems that enclose them are all glass, the retail spaces serve as free advertisement while also providing a visual experience as one travels upwards. Additionally, various retail stores can serve as landmarks, reducing the dependency of people on signage for orientation and more towards a store, brand, or product. In these two loops, these cabs would stop at every floor, and the waiting time for a cab is minimized as there would practically be an available elevator to move up or down at all times.

HORIZONTAL AVENUES

As mentioned earlier, certain express cabs end on these horizontal avenues that allow people to cross over from the major vertical street and into the smaller streets that would lead to their semi-public muses. These horizontal avenues would contain public program such as a market with specialty vendors in the center of the building, a health club and pool on the next avenue up, and a hybrid movie theater and University of Chicago lecture halls on the avenue below. The top avenue is reserved for a terraced green amphitheater and winter garden that would contain a park, bar, restaurant, and seating space year round.

The ends of these avenues would form public 'squares' or 'cubes' that would allow for service-based retail such as laundromats and dry cleaners as well as seating spaces and gardens that would contrast the linear public space of the avenue by providing a public space as a destination and place to stay and socialize.

MINOR VERTICAL STREETS

The smaller vertical streets that link the horizontal avenues to the muses each contain a stairwell and two large elevator cabs that function like conventional ones, where a user must input their destination. These vertical streets are intended to link one block of residents with the other, and incorporate a kind of shared space with small balconies and patios inbetween.

These spaces also serve as pressurized fire-proof egress routes as they are surrounded lengthwise by concrete walls and use fire shutters that close automatically in case evacuation is required. This maximizes efficiency and comfort for users during emergencies by allowing them to use the protected elevators and stairwells that they would normally use on a daily basis so they are familiar with these egress routes. Elevators that are not in proximity to the location of an event can be used where there is no danger in smoke rising up shafts. Rescue personnel can use cabs as they move up as occupants theoretically will use the elevators going down only. These vertical streets play the role of the single conventional core which remains quite vulnerable.

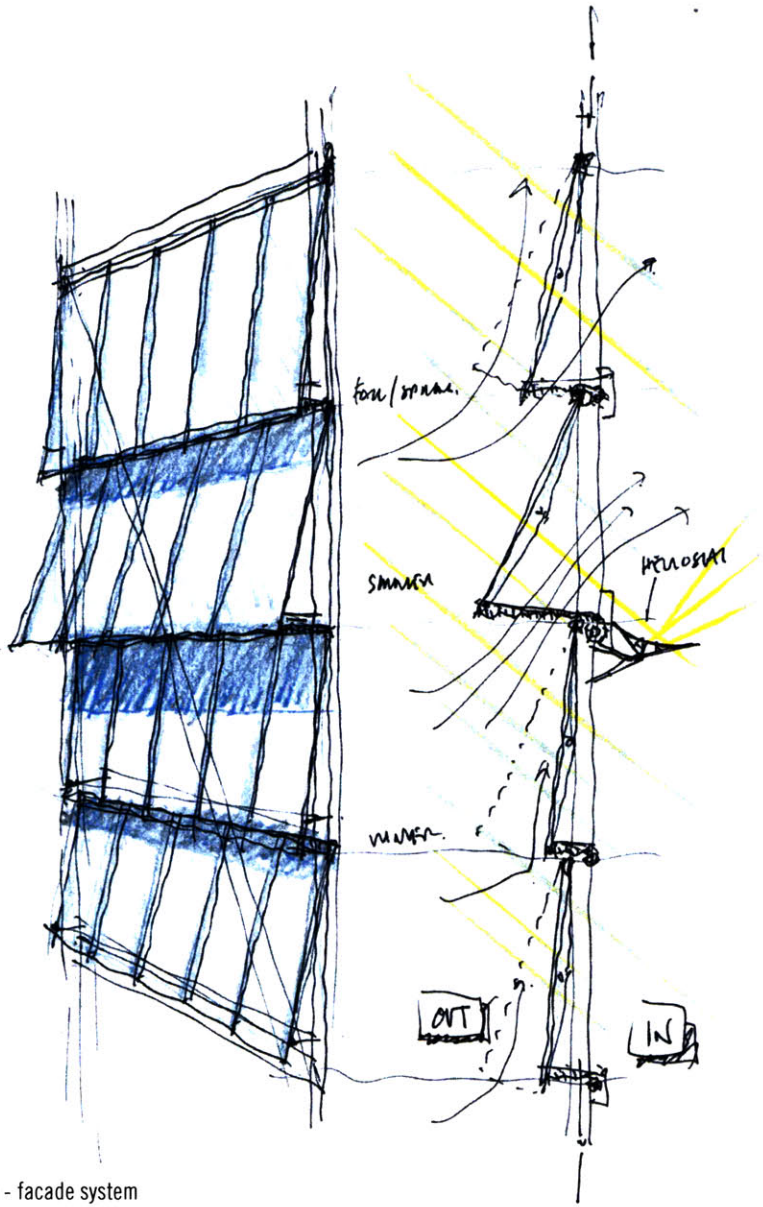

FIG. 9.20. Diagram - facade system

STRUCTURE

Perhaps the most illustrative of the bridging earth and sky concept is the structural system. In order to support the five bundled towers, each is supported by a large vertical super-truss whose form and member size taper and grow smaller as they approach the sky. The intention here is two-fold: first, to create a more stable structure by widening its stance at the base, and two, to acknowledge the "bridge" concept again, that the structure begins to dematerialize as it meets the sky because it is the earth that provides the structural stability, and not the sky. The structure is intended to support the enlarged glass walls that enclose the town hall and winter garden at the top of the structure, and also hold the heliostats and wind turbines that will be discussed later.

Each of these vertical super-trusses are coupled with its neighbor form super-columns which house the fire-proof egress paths that comprise the vertical street. These super-columns are laterally bundled together by a diagrid structure – a diagonal grid structure formed by several smaller members to increase lightness and redundancy – which also supports the exterior skin.

ENVIRONMENTAL SYSTEMS

A sustainable agenda has purposefully not been emphasized in order to focus upon the social and spatial systems of the skyscraper, however it does exist.

The exterior skin consists of a shingled glass façade, with canted surfaces that overlap each other like clapboard siding. These glass shingles are operable by swinging out from the bottom in order to allow the skin to "breathe." Incorporate in this system though is a woven metal mesh screen that retracts outward preventing birds from flying in, but also providing shade during the summer months. For instance, as the summer sun begins to heat the interior of the skyscraper, the windows would cant outward, extracting the mesh screens, and effectively shading the tower from the outside, minimizing the amount of heat that would radiate inside. In the winter months, the façade would be close and the screens retracted, taking advantage of passive solar heat gain to heat the building.

This glass skin also serves other purposes. It eliminates any opportunity for snow and ice to accumulate along the façade, and minimizes the amount of moving parts. Since this is the secondary skin with respect to the dwelling units, it was also important to minimize any obstructions to views. Finally, the canted glass surfaces will more likely reflect the color of the sky when oriented vertically, which would create an ever-changing appearance of the tower, sitting lightly along the skyline in stark contrast to the black Sears Tower and John Hancock Center.

This secondary skin effectively creates a microclimate inside the tower, blurring the boundary between what is inside and outside. In other words, temperatures in public spaces of the skyscraper fluctuate moderately in response to exterior conditions, but serve really as a moderator between the internal dwelling units which are more likely to remain constant room-air temperature, and the outside extremes.

Although this theoretically will reduce energy consumption, five wind turbines and heliostats crown the top of the skyscraper. If the earth on the one side of the "bridge" provides the structure and the people for the skyscraper, then the heliostats and wind turbines form the end of the "bridge" for the sky – using the resources of the sky in the form of light and wind energy.

Based on Foster and Partners design for the Enercon E66 wind turbine which is approximately 300 feet in diameter and is projected to provide enough energy for 1,700 suburban homes, it is anticipated that five wind turbines that measure approximately 60 feet in diameter each can provide a substantial amount of the energy requirements for the approximate 1000 smaller dwelling units in the skyscraper.

Internal "muses" as defined earlier would require some form of natural daylight in addition to the small amount of reflected and ambient daylight emitted from voids between modules and along the vertical streets. To supplement this need, five heliostats with single collectors are mounted on top of the wind turbines in order to collect daylight, and using fiber-optic cables, daylight is then fed into solar hybrid light tubes.

These tubes consist of a hollow glass tube with diffusing mirror at the end in order to filter daylight into otherwise dark spaces. This light can also be supplemented by incorporating an LED light within the light tube to compensate for lighting on cloudy days.

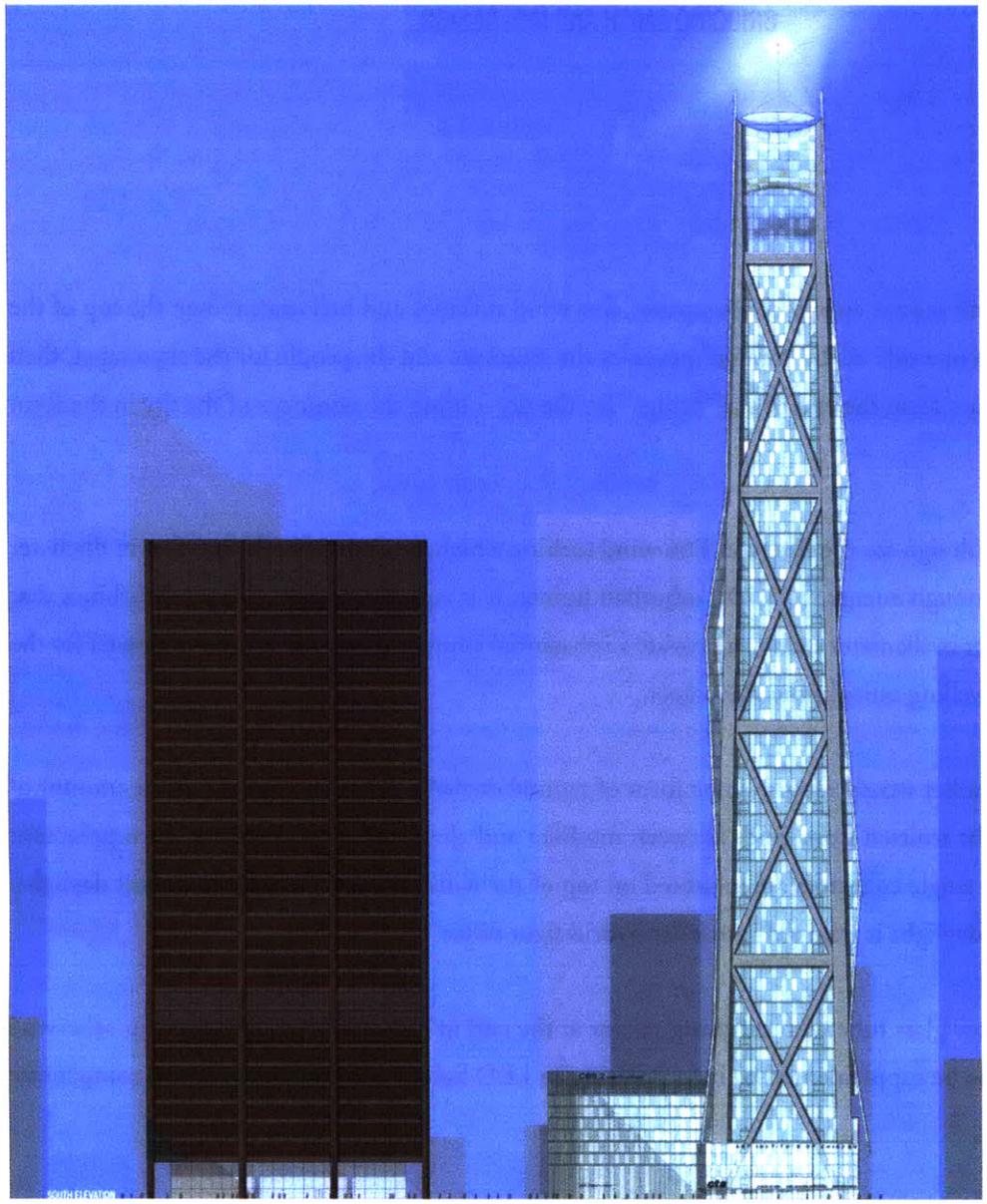

FIG. 9.21. South elevation

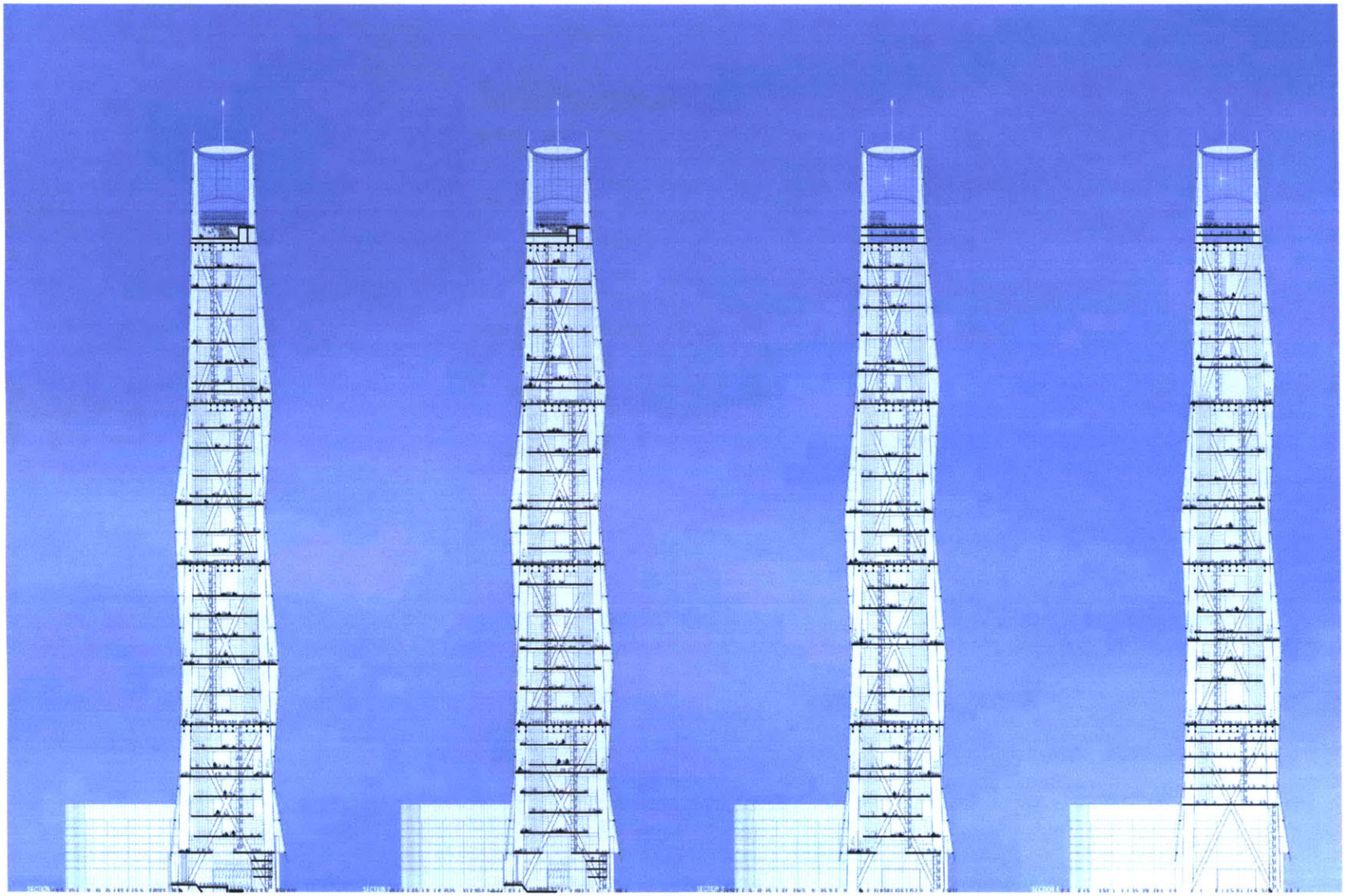

FIG. 9.22. Transverse sections

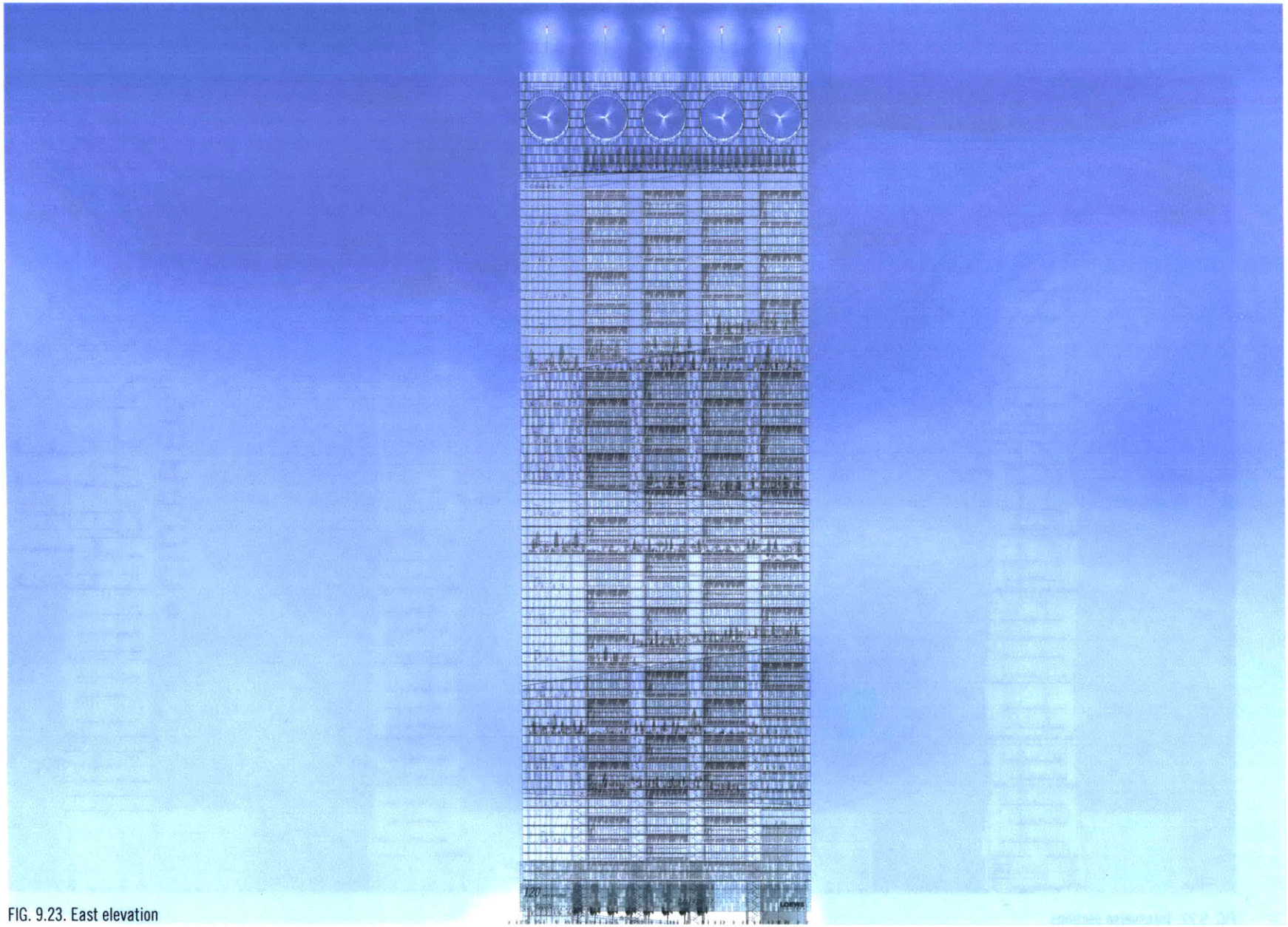

FIG. 9.23. East elevation

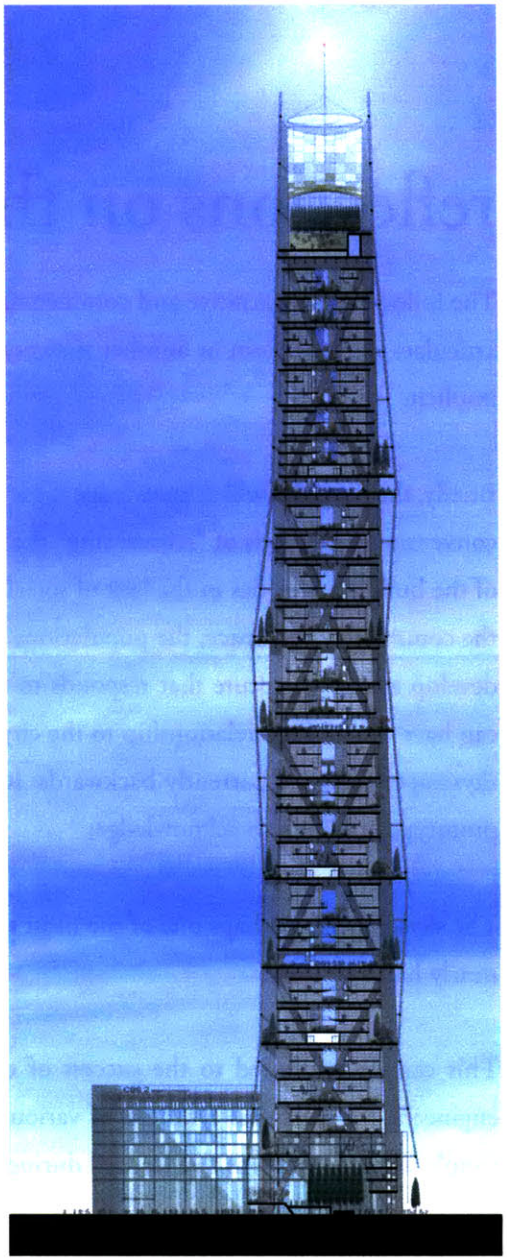

FIG. 9.24. Transverse section

reflections on the skyscraper *narrative and commentary*

The following is a narrative and commentary about the thesis from beginning to end, intended to act as a device to articulate in some form or another the very many lessons learned along the way – some are explicit, and some are implicit.

Briefly, the narrative will acknowledge some of the following themes and lessons that have emerged during this thesis: conventional methods of "reinventing" the skyscraper don't recognize that perhaps a deeper, fundamental problem of the building type lies in the lack of social or spatial design, and other conventional systems should be dictated by the community and space; the populations in skyscrapers deserve to be treated as entire, thriving communities who develop a unique culture that responds to their density and of course their relationship to the sky; the skyscraper can have a symbiotic relationship to the city by enlivening it rather than deadening it; the "prototypical" process of skyscraper design is currently backwards: it designs from the outside in and is far more complex than the existing prototype is willing to acknowledge;

The skyscraper is perhaps one of the most successful examples of an architectural prototype – it has not changed in nearly half a century.

This can be attributed to the success of the original prototype and the ingenuity of its original architects and engineers. The seamless synthesis of various disciplines results in a building type that presents itself as deceivingly simple when in fact – as I've learned during this thesis – it is a highly complicated network of systems.

However, this integration of systems becomes more of a compromise among various disciplines than an architectural ideal. Attempts at reinventing the skyscraper have almost always worked within the limitations of the prototype without questioning some of the larger fundamental problems that plague the building type. Why? I'll try to answer this question here.

My original research began with coursework for 4.665: Advanced Study in Modern Architecture: The Skyscraper, with visiting HTC professor Gail Fenske, who thankfully agreed to be on my thesis committee. Having looked at the history of the skyscraper from conception to current trends, I realized that throughout its history architects have endlessly tried to reinvent the building type. For my paper, which is included in this thesis document, I had originally proposed to examine the instances in time when major attempts had been made to "reinvent" the building type. But I never did get around to writing that specific paper and elected to examine the sustainable tower from an aesthetic standpoint, because writing about reinventions in the building type always focused on one of the following systems: technology, circulation, facades, sustainability, or structure, and although it would have been valuable, I didn't want to take the time to write something that has been written over and over and over again. Additionally, reinventions tended to focus upon only one of those systems, which I might suggest here is one of the fundamental reasons the prototype hasn't grown and matured in half a century.

As I mentioned earlier, the skyscraper prototype as it exists today is deceivingly simple. But each system is endlessly interwoven and related to another so to "reinvent" the tower while examining only one system is almost certainly valuable, it doesn't present a very promising commentary on the prototype. In effect, the attempt falls short of being a true "reinvention" of the skyscraper.

I knew from the beginning that I wanted to tackle all the problems of the skyscraper. This is the reason why I avoided approaching my advisor Andrew Scott about my thesis at first because I knew he would have favored a simpler, more reasonable approach. This approach of his, which I truly admire, would be most valuable when it came to examining systems' integration – aspiring to duplicate the simplicity of the existing prototype.

A question Andrew repeatedly asked me after I delayed speaking to him was, "So, what is your thesis?" Andrew is very good at getting to the essence of the problem through a line of questioning, and teaching this by example. As frustrating as that process has been sometimes, it almost always leads to innovative solutions at every scale. A richness emerges in architecture through this approach that has an inherent beauty that stems from an intellectual idea and rigorous design exploration, placing at its essence the spirit of a place.

"So, what is your thesis?" made me realize that simply reinventing the skyscraper and its systems was more or less worthless. Not entirely, but it wouldn't have maximized its educational value for me, and hopefully all parties involved. After I took the fall semester off to figure out my thesis, I began to understand the problem of simply reinventing the skyscraper: it would be near impossible to be able to judge whether or not what I was doing was better than what currently exists.

I began searching for a high-rise condo in Chicago during my semester off, and quickly realized the frustration of the homogenously stacked floor plates – the pancake effect. I was dependent solely on signage to tell me where I was vertically in the tower, on top of the fact that hundreds of people living under the same roof rarely if ever speak to

each other. The elevator offered some connection, but even then elevator rides are usually accompanied by complete silence. I asked my realtor through her sea of rehearsed rhetoric of fancy architectural finishes, "How does this building foster a community among its residents?" She ignored the question. Twice.

I did some independent research with Gail, which included the prerequisite site information but also examining the vertical neighborhood and something I called the "spatial gradient." Both have been defined in great detail earlier but what emerged here was the question of what the social and spatial systems of the skyscraper were.

This "spatial gradient" showed me that every example I'd seen of the skyscraper never truly addressed either issue. Some tried, like Zaha Hadid's proposal for the 42nd Street Hotel in New York, but it too was a series of smaller conventional buildings put together around a "vertical street." It simply wasn't radical enough.

I entered the thesis semester with a very clear idea of what the skyscraper problem was: the social and spatial systems of the skyscraper didn't exist as design considerations and therefore have never really been recognized as problems worthy of fruitful investigations. How to translate these problems into an architectural solution was another story.

Admittedly, I began designing the "living skyscraper" quite conventionally. I studied heights and massing, and began suggesting sexy forms. Then, I drew the plans and placed volumetric modules to fit the form I had arbitrarily conceived a week earlier. I presented the idea to the entire committee about a week or two before the actual design review and realized half-way through my presentation that I had fallen flat on my face because what I had was

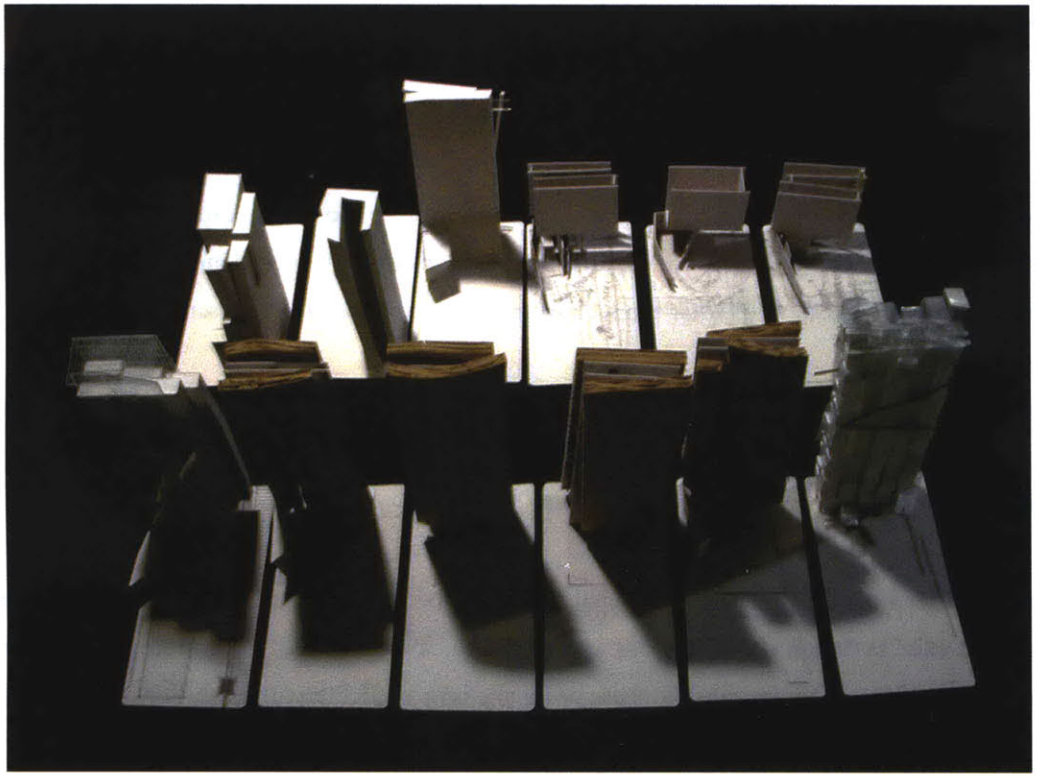

FIG. 10.1 Study models

no different socially or spatially from the existing prototype – except it was a lot more expensive (This thesis has purposefully neglected to address economics. Partially, I simply don't know enough to effectively address it, but also finances were well beyond the scope of the thesis and the amount of time I had to complete it. I also realized early on that another strength of the current skyscraper (or high-rise) prototype is that it is at its maximum economic efficiency – any change to it will undoubtedly add cost that would be difficult to justify to a developer. Therefore, in the interest to seek out the fundamental problem of the skyscraper, I reluctantly ignored the financial system of the building type) and far more complicated.

To be honest, I never felt that I had wasted any time during the design process because as Andrew put it, sometimes you have to draw something and get it out there in order to realize that it's wrong and make progress.

For the actual design review, I didn't make any more progress and did the exact same thing that I had done two weeks earlier – I designed yet another variation on the existing prototype but simply made it even more expensive and even more complicated. Again!

From the beginning, Andrew suggested I that I should do some drawings that "map" the vertical neighborhood. Half way through the semester, I finally listened to him – and this wasn't because I was ignoring him or didn't hear him, I just thought other things were more important at the time. Perhaps I wasn't ready yet. I was desperate to make some progress and was quickly running out of time, so I thought, "If I'm borrowing all the qualitative characteristics from the horizontal neighborhood, why not the organizational structure?" The series of studies in the chapter "Mapping

FIG. 10.2 Final presentation in AVT

the Vertical Neighborhood" was the result of this investigation, and obviously the design progressed quickly from there.

In retrospect, I realized that I continually fell back on conventional methods of designing and criticizing the skyscraper because it was easier that way. It was less work. I knew I had to include some form of repetition but I tried to do it in only one drawing – the plan. The "mapping" exercise forced me to design using sections and in the end, the plans were more or less inconsequential. The design process was naturally inverting itself – an objective I set forth at the beginning of the semester. The skyscraper should be designed from the inside out, and not the outside in. It took me about a month and half to follow my own set of rules.

It was difficult to convince myself, and Andrew, that what I had was a good solution. He quickly pointed out in the first discussion I had with him about the final scheme that there was so much space given to circulation (the muses) and he asked about how much space the residents actually paid for. He, and later Frank Duffy as well, also questioned the lack of flexibility of units and suggested that units could organically increase in size. I didn't have any answers and went home rather discouraged because I still could not judge whether or not what I was doing was better than the current model – a predicament I was aware of since the beginning of my research.

That night I realized that the muses and their relationships to each other were critical to the success of the vertical neighborhood and became convinced that this was the right thing to do – so I made them 5 feet wider. The issue of flexibility was a valid one too, however residential towers are rarely flexible – it is one of the ways office buildings,

which must be extremely flexible, are distinct from the residential tower. It could also be detrimental to the sense of community not to mention the economic sustainability of the vertical neighborhood. For instance, if a group of wealthy families bought up several spaces in the vertical neighborhood, they would substantially reduce the population and therefore take away the support that the retail would rely on to remain financially viable.

I acknowledge here that the final design is far from perfect. I admit that I originally had set out to design the ideal residential tower, but throughout the semester began to realize that the importance or value of this thesis laid not so much in the final product, but the line of questioning that developed during the design process. To design yet another prototype would have been hypocritical with respect to the objectives of the thesis. Instead, a loose prototype could be suggested for the skyscraper design process that would prioritize, or at the least raise an awareness, that the social and spatial systems of the skyscraper should not exist by default, but rather by design. This prioritization could provide a social agenda that those reconsiderations of conventional systems could be judged by – whether or not they improve the culture and spirit of the skyscraper.

TOO MUCH TO DO IN TOO LITTLE TIME

The final review offered little surprises, however it was instrumental in summarizing or articulating some of the new questions this thesis raises about the skyscraper and how it is designed. Joined by Patricia Patkau, Jeff Wooding, Peter McCleary, Sebastian Irrarazaval, along with committee members Andrew Scott, Gail Fenske, and John Ochsendorf, the hour and a half discussion brought up several issues, some that were beyond the scope of the thesis in terms of time, and some pointing out design flaws. Both sets of comments are equally valuable.

DIVERSITY, PRIVACY, SAFETY, PROGRAM, BOUNDARIES

I'll begin with a suggestion Patricia Patkau made. She said it would be a valuable exercise to revisit the five criteria that define successful neighborhoods according to Jane Jacobs: diversity, privacy, safety, program, and boundaries. I won't repeat their specific descriptions here as they have been previously addressed, but a quick response is yes, I believe I met all the five objectives, at least conceptually – and this is perhaps where the design investigation lacked. There is much more to the five objectives. These are not only much more complex issues than the thesis has let them be by limiting the discussion to a conceptual level (in the interest of time, of course), but should truly be redefined for the vertical neighborhood. For instance, there lies a much different degree of diversity in a vertical neighborhood than a horizontal one. Market forces will dictate that the cost of a vertical neighborhood, and the promised improved quality of life and of spaces, will create higher demand and therefore naturally elevate prices. This certainly raises a great question in that is it possible to design an affordable vertical neighborhood? Sure, I think – and I'm thinking of a model very different from public housing projects. But each vertical neighborhood depending on its location and height will attract various types of populations segregated by income. But this is ok – neighborhoods exist in similar manners – some neighborhoods are more affluent than others. It becomes an issue of accessibility, though. Although someone who is lower-middle class may not be attracted to an affluent neighborhood, they are free to pass through it and share in some of the public spaces, and vice versa. So the housing stock may limit the amount of diversity in the vertical neighborhood, however the retail and/or supporting could potentially counter-balance that by attracting a working population. Even this brief analysis is not enough, but then again, how far is too far? It is impossible to design an entire vertical neighborhood – I know, I've tried.

RETAIL VIABILITY

This brings me to the issue of indeterminism, brought up by Jeff Wooding, who also spoke of the viability of the retail. To quickly address the latter, I specifically chose the site because a population of visitors and daily users already exists even though the site has been vacant for over a decade. Its proximity to the Randolph Street Theater District, retail corridor on State Street, history of Gallery 37, and adjacency to City Hall and the Daley Center promised a fairly diverse population that exists there. Had the fluidity of the major vertical street of the design had been a much more fluid extension of the existing street, I think this would have been much more convincing. I'll address the problem of the ground plane shortly.

INDETERMINISM

To return to indeterminism, it is what begins to set the skyscraper apart from most other buildings types. The skyscraper and all its spaces are designed, but in the office, potentially by as many designers as there are floors. Therefore, the skyscraper architect and the fit-out architect share a "language." I don't say "dialogue" because there is no back and forth between the two. They share this architectural "language" in the modular grid system – usually 5 feet in the United States, and that is rationalized by standard office spaces, etc. It is quite different in the residential tower, though.

The residential skyscraper architect designs all the spaces, many times down to a palette of finishes that is left up to the end user to decide – similar to suburban sub-developments. For some reason, this "semi-custom" design seems like an amenity in the residential skyscraper, but at least from an architect's perspective, is one of the problems that

plague the American suburb. So where does the indeterminism lie? Well, first, the residential tower is arguably more complex a design problem than the office building. The synthesis of varying unit sizes dictated by the developer with a single structural, façade, and circulation system is not as simple as it may seem. So much so that many residential towers lack a structural grid, but favor column placement that provides optimum unit layouts and flexibility (at least in design). Typical floors are created, and repeated, creating the illusion that every square inch of space is designed. This act of repetition is in fact where indeterminism in the residential tower lies. There is no consideration above the first floor of typical units, and therefore the relationship of floor to floor, or pancake to pancake, is nil. It is never designed because it never has truly been brought to attention.

It is inevitable when designing a building that will house a population equivalent of a small town that the design of spaces must be delegated to several parties. I used the volumetric module in my design scheme because first, it minimized floor areas in order to maximize the number of residents who might coexist within a given horizontal section cut of the tower. Second, it used height, and therefore volume, as a way to add space. This results in breaking down the pancake effect, opening up visual corridors to and from various muses, and it broke down vertical living to a smaller scale, but within a grain much more appropriate for the skyscraper – vertical. The indeterminism here lied in the volume of space that comprised the unit.

Indeterminism also existed in all the public spaces and for some of those spaces, this was problematic. For retail spaces along the major vertical street, they share an indeterminism that parallels that of the volumetric units, but at a slightly larger scale. But for the horizontal avenues and public squares that terminate them, they must be designed

not only to demonstrate that the elevators and stairs from the smaller vertical streets are sufficiently distant enough from each other to accommodate a public program, but also to challenge conventional notions of typologies such as the grocery store, school, and even the Home Depot, because they must follow a vertical orientation. Market forces dictate much of what fills what is considered 'retail,' but the exposure and orientation of the 'retail' and other public spaces must be rigorously questioned, explored, and designed. I didn't get a chance to illustrate this in the design, and was rightfully criticized by Peter McCleary when he said that the public spaces were still quite homogenous. I disagree, however, because this indeterminism was a result of lack of time, and not indeterminism as a design tool for the skyscraper.

THE NATURE OF PUBLIC SPACES

The spatial thresholds that exist in the design to separate public and private remain diagrammatic. The nature of these spaces would have clarified an issue Sebastian Irrarazaval raised which suggested that public spaces should vary in its nature – some should be more domestic and therefore more private, and some should be more public, open to all who visit. This is true, and I intended for a hierarchy of public and private spaces to exist – and they do – but at a schematic level. And I think the schematic design hinted at its merit, however lack of design detail failed to prove it.

The variation of public spaces brings up an interesting issue of ownership. What does the developer own, what spaces are a part of a "management fee" or "monthly assessment," and what spaces are the owners responsible for? For now, my answer is that ownership is directly related to the degree of public or private access. For instance, the very public

winter garden and base of the building are the realm of the developer, whereas the muses are owned completely by residents and they are solely responsible for maintaining it. Interwoven gardens that occur outside the shared service modules could be owned by residents, but maintained by the developer for a fee. However, residents could elect to lease out their communal space to make the lessee responsible for the assessment instead, or keep a communal space and pay a nominal assessment for maintenance that would be justified by the communal space. Ideally, the residents could maintain the woven gardens themselves, which would encourage a sense of community.

SKYSCRAPER CULTURE

Peter McCleary pointed out that he appreciated the privacy afforded to him by the existing skyscraper model. He stated that his neighbors were different from him, and knowing that, he didn't really care to know who they were or desire to interact with them.

This is the current culture in the skyscraper – people have accepted the fact that in the skyscraper, the architecture does not allow them to know their neighbor and therefore, they don't want to. And that's fine – throughout my lifetime and most likely subsequent generations', the majority of high-rise housing stock that exists will perfectly suit this culture. Why? Because the residential skyscraper created this culture in the first place.

The vertical neighborhood could change skyscraper culture in just the same way. By encouraging and fostering a hierarchy of communities, it could change the perception of urban living. Not every building has to be a happy community, and really shouldn't be. Jeff Wooding said he would prefer to live in a community where he knows

people whereas Peter McCleary does not. The vertical neighborhoods of the future should have different types of cultures that will suit the Peter McCleary's and Jeff Wooding's creating cities with even more diverse housing options than originally thought possible. Jeff Wooding and Peter McCleary do not represent polar opposites however – Jacobs states that those who live in cities appreciate a certain type of privacy, that to me, translates to many more 'acquaintances' than 'best friends.' I would agree.

This concept of limited privacy has a variation on it as well, and this variation is what formed the basis for the spatial matrix of units. During my thesis, I had visited a friend of mine who had lived in Beacon Hill for about 6 months. I had walked around the neighborhood several times, always trying to peek into windows to see how perfect these apartments really were. But most blinds and curtains were drawn. Sitting on her couch on the 5th floor of her building, which just so happens to be the top floor, I looked out the window and saw across the street and up the block people living in their apartments with the blinds open! When I wondered aloud what those people were doing, my friend volunteered information about each and every one of them: one apartment had two girls who went to Northeastern and one had a boyfriend and the other seemed single, a retired couple downstairs from them, and others. We later walked up to the roof and looked down at the backs of all these different buildings and the varying heights of roofs and porches and window sizes created an absolutely beautiful richness of space – indeterminate by the way. But I could see all the people in their kitchens eating, washing dishes – one guy was cleaning his porch door. And I could start to understand who they were, without ever really knowing them. My friend had never talked to the girls or retired couple across the street, in fact never bumped into them on the street they shared, but she knew of them, and most likely they knew of her, and me. There exists a sense of community above the street that only

residents partake in and to me, it's a magical balance of voyeurism and privacy that makes living in the city distinct from the suburbs, and therefore for me, much better.

FORM

This issue was not brought up in discussion but I wanted to say a few words about it.

I remember when I was struggling during the pre-design and design reviews to come up with a design that was distinct from the existing prototype, at some times I thought this was impossible. I was already using the diagrid structure and Andrew had suggested that this type of structure would allow the skin to bend and fold while still maintaining a structural integrity. And that was true. So the form should respond to what occurs inside [the spatial matrix] and not the other way around as per convention. As the design stands, the folding façade responded to the interwoven gardens – the connections among the blocks of muses. Although the outside responded to the inside – which was emblematic of the design process – there never was a dialogue between the two. In other words, the wavering form didn't make the spatial matrix waver at all, or shape public spaces that probably would have created a much more diverse series of public spaces.

FUNICULAR

The funicular-elevator hybrid design was a very simple concept yet has an enormous potential even in conventional towers today.

Laterally traveling elevators are currently in development today, however the majority of the elevator shaft, which takes up a tremendous amount of core space, remains empty most of the time. A looping system such as the one I used for the vertical street that uses a funicular hybrid and is modeled after a mass transit system, could free the existing prototype from its dependency on a single core and as impossible as it may seem, make the prototype even more cost efficient by reducing shaft space.

This could have implications on form, as the looping system may want to be expressed on the exterior further minimizing the loss of space to shaft space since the cabs could be considered running outside. Cores could be reduced significantly in size, and distributed in small pieces.

My design exploration didn't seek the full potential of the looping system as it still remained vertical and didn't necessarily respond to the wavering façade. Perhaps this looping system could have informed the malleable skin. Regardless, there is a much greater potential in the looping funicular hybrid system than I was able to explore, but may be the one innovation from this thesis that can be economically justified and therefore feasible in the near future.

FLUIDITY AND ORIENTATION

The skyscraper model today typically has a glass ground floor consisting of a series of corridor-like elevator lobbies. The distinction between inside and outside is tenuous, yet clear. The glass represents an absence of material thereby creating a superficial 'fluidity' with the city streets and the architectural finishes of the lobby. But what is public

and private is too clear, and the space of the street functions vastly different than the elevator lobby. The glass wall, although intended to be absent, in fact represents a distinctive threshold between the city and the building.

The glass wall marks two extremes when speaking about the relative perception of distance. For example in the city, a block or two from one destination to another, such as your house to the subway stop, is considered quite close and convenient – even in the rain and snow. By contrast, as soon as one passes through the glass threshold of the ground floor lobby, the perception of distance changes dramatically. All of a sudden there is a race between the door from the street to the door of the office or dwelling. This is a result of poor orientation and experiential quality of space. Allow me to explain:

In the city, there is a visual variety to occupy the eyes keeping the mind active. Several layers of phenomenological devices act at once such as the variable quality of daylight, wind, and temperature to create a slightly different spatial experience each and every day. Orientation is always clear – you know where you are all the time.

Once I enter the lobby of the tower, I enter an environment that has a constant temperature year round, constant lighting level throughout the day, and no wind or anything visual to stimulate the mind. The corridor-like elevator lobbies are many times tall and narrow and awkward to the point that it seems that they were designed intentionally to prevent people from interacting. I enter one of several elevator cabs all of which look, feel, and smell the same, and I get frustrated when there are multiple stops to floors before I get to reach mine. By the way, everytime the elevator doors open, I see the exact same elevator lobby except each one has a different number on it. I find my number, enter

another corridor completely dependent on fluorescent light, and finally reach my destination that has a spectacular view of the city below. The street and final destination, although sometimes hundreds of feet apart vertically, share one thing in common though – they naturally provide orientation via the visual and sensual environment and not by signage. The journey between the two is horrific experientially – no wonder people race to get from the street to their offices.

Today, the skyscraper model represents a goal of people reaching from point A, the ground floor lobby, to point B, the door of their office or apartment. Social interaction is a direct function of circulation, so to increase the opportunities for people to interact, the circulation must become less efficient and lengthened. This means that the journey has to be visually and sensually stimulating, building a case for a microclimate and natural ventilation. Retail can be placed along these circulation paths helping to justify the costs, but also ensuring that people inhabiting that space will participate in the visual and sensual experience, not to mention encouraging a community.

DESIGN PROCESS AS PROTOTYPE

In the end, the prototype of the building type that exists today remains because it's most efficient to design for all disciplines involved – it's an accepted compromise across disciplines and has been proven many times over that it works, and expedites the procurement and delivery of the skyscraper. This thesis suggests that perhaps the line of questioning we currently ask is not the correct one, and new questions need to be raised, leaning towards the social and spatial, that may transform the nature and experience of the skyscraper, and willfully challenge conventions.

Foster and Partners uses the phrase "consistency through diversity" to describe the design culture in their studios. "Consistency" refers to the manner of design, developing innovative concepts and a rigor towards questioning and exploration that leaves anything, especially conventions, vulnerable or rather susceptible to "reinvention" – with a primary goal of improving design. "Diversity" refers to the final product: a body of work that demonstrates a mastery that spans several different typologies, each responsive to cultural, social, and environmental issues of diverse clients, cultures, and sites.

By revisiting the skyscraper prototype as a final product, reinventions and innovations will almost always miss the point. However, by treating the *process* of skyscraper design as the prototype and *consistently* addressing social and spatial concerns as a priority over all other systems, we will undoubtedly find ourselves building a more genuinely diverse body of skyscrapers for the world, relying not on its form or appearance for diversity but rather its uniquely collective culture.

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FIG. 11.1 $408,000

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colophon

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