ORGANIZATION AND ABSTRACTION:
THE ARCHITECTURE OF SKIDMORE, OWINGS & MERRILL
FROM 1936 TO 1956

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ABSTRACT

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This dissertation examines the history of the architecture firm, Skidmore, Owings & Merrill (SOM) between 1936 and 1956. While focusing on the birth and growth of SOM, this study attempts to position the firm in a larger historical development of the United States in the mid-twentieth century.

While Louis Skidmore and Nathaniel A. Owings established the firm in 1936, the dissertation begins at the beginning of the Great Depression in 1929. During the 1930s, Skidmore and Owings learned critical lessons from industrial designers about the significance of the public as well as how to attract their attention. The founders discovered the importance of investigating people's reactions to certain forms and spaces, mainly working on small shops and exhibition halls.

During WWII, SOM worked on prefabricated houses in the town of Oak Ridge, TN, which was part of the Manhattan Project. While working confidentially for the military for about three years, SOM mastered diverse kinds of building technology and gained experience with the various programs necessary for a conventional town. In addition, the firm constructed a modern architecture-engineering firm, which could

handle complex architectural and engineering projects. As a result of their previous experience, SOM evolved into a leader in designing glass and steel office buildings after WWII, refining the architectural language it had discovered during the war. In the 1950s, the firm continued designing and constructing large town projects for American military and other corporations throughout the world.

This dissertation records the shifts in the profession of architecture in each historical context throughout the mid-twentieth century. The first three chapters cover the years from 1929 to 1939, 1939 to 1945, and 1946 to 1956 respectively. The fourth chapter addresses the architecture community's perception of SOM and the firm's organizational characteristics. This dissertation investigates how SOM attempted to modernize architecture as a whole, responding to new materials as well as to the spatial and cultural conditions of the world.

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INTRODUCTION

Skidmore, Owings & Merrill and Modern Architecture in the United States

The first sentence of Nathaniel A. Owings's 'Forward' to his autobiography, *The Spaces In Between: An Architect's Journey*, reads: "Someone else will have to write an *objective* history of Skidmore, Owings and Merrill."[1] As one of the two founders of the firm Skidmore, Owings and Merrill (hereafter SOM), Owings composed a narrative based on personal memories but left it up to historians to fully explain the origins, achievements, and complications of the firm whose birth and continuous success in the mid-twentieth century could not have been realized without his contribution.[2] It has been more than three decades since the publication of his memoir. While many books about SOM and its partners have been published over the last several decades, few have fulfilled Owings' wish.

The extensive literature about SOM follows two general trends. Some books

[1] Nathaniel A. Owings, "Forward," *The Spaces in Between: An Architect's Journey* (Boston: Houghton Mifflin Company, 1973), vii.

[2] Skidmore, Owings & Merrill (SOM) is employed to refer to the firm known differently along the history as Skidmore & Owings, Skidmore and Owings & John Moss (SOM), Skidmore, Owings & Merrill (SOM), Skidmore, Owings, Merrill & Andrews (SOMA), Porter-Urquhart, Skidmore, Owings & Merrill (PUSOM). About SOMA, Nicholas Adams, "Three's Company: The Early Years of Skidmore & Owings," *SOM Journal*, Vol.4, 2006: 161-65.

concentrate on the firm's prominent designers such as Gordon Bunshaft, Myron Goldsmith, Walter Netsch, and Bruce Graham. They are treated principally as individuals, instead of as members of a large, interconnected organization.[3] Most other books deal with buildings designed by the firm, focusing on formal, historical and technical analysis. Both of these trends apply conventional, analytic paradigms of an artist-architect to the analysis of a large corporate firm. The large firm is an organization, a network of various professionals, rather than a series of individuals. Therefore, the architects of SOM are different from conventional artist-architects and thus should be approached in a different manner. Furthermore, buildings completed by the firm significantly differ from those of individual designers in their architectural expressions and social meanings.

The collective and technological nature of SOM's production forces us to think beyond the traditional territories of the discipline, posing a challenge in writing a historical account of the firm. The collaborative aspect of the firm requires an explanation of the whole entity rather than the distinctive members. In addition, the production should not be discussed as the product of individual artistic efforts, but rather as that of

[3] Criticizing historians and reporters who try to identify a designer of a large building, Gordon Bunshaft described the importance of a team: "I've been trying to explain that I'm part of a team, and I really believe that. I think I've told you before I don't believe any man who sits alone can create architecture. It's a team effort. There just happens to be some man that has to make a decision on things, that's all." Gordon Bunshaft, *Oral History of Gordon Bunshaft*, Interviewed by Betty J. Blum (The Art Institute of Chicago, 2000), 185.

collective efforts. A large firm's productivity depends on the division of labor and the specialization of individuals within a larger system. Thus, individual designers should not be the main focus of the research when studying a firm such as SOM, nor should their buildings be treated as if they were created by independent people.

Fortunately, new trends in architectural research on SOM are emerging, and this dissertation greatly benefits from them. *Modernism at Mid-Century: The Architecture of The United States Air Force Academy* (1995), edited by Robert Bruegmann, reveals some of the complicated cultural, political, and architectural stories that underlie one major commission; Robert Allen Nauman's *On the Wings of Modernism: The United States Air Force Academy* (2004) deals with the same building complex. Despite their clear merits, both books focus more on the building rather than on the firm. Furthermore, neither of the books provides insight into how the firm came into being. Therefore, a comprehensive and specific account on the history of SOM's design process is essential.

Nicholas Adams's *Skidmore, Owings & Merrill: SOM Since 1936* (2007) is an open, inclusive and historical record of the firm from its inception. Adams presents short and unfamiliar yet fascinating accounts of SOM and its major buildings, including earlier works. His book is one of the first to discuss the firm's history in its entirety. Adams enumerates key issues that could lead to future research subjects on SOM, and his work therefore provides a critical anchor for the future study of the firm. Lastly, Reinhold Martin's book, *The Organizational Complex: Architecture, Media, and Corporate Space* (2003), provides a new perspective on corporate architecture. His provocative yet perspicacious analysis of interrelations between architecture, media and corporate space presents refreshing insights into SOM and post-war architecture in general. Yet, despite his critical contribution to the study of the firm, Martin's research is not specifically about SOM and thus does not differentiate this firm from other post-Second World War designers or offices. In addition, Martin's goal is not to provide historical details on corporate architecture, but rather to construct a new perspective on architectural developments in the mid-twentieth century.

The aim of this dissertation is to present a historical account of SOM as an organization. It is less about specific individuals and more about the organization as a whole and its historical meaning. It also intends to present a social and cultural history of the development of architectural practice in the United States, demonstrating the impact of a large organizational practice on architectural communities. In doing so, this dissertation will contribute to creating a more accurate, diverse and multifaceted picture of American architectural developments in the twentieth century.[4]

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[4] Gwendolyn Wright's recent book on the history of American architecture is one example of a more

Considerations on Modern American Architecture

In order to grasp architectural developments in the United States in a comprehensive manner, this dissertation will emphasize some of the major shifts that occurred during the Great Depression, WWII and the early postwar years. These shifts were psychological, organizational, formal and technological. In addition, these changes coincided with the transformation of the economic structure of the United States. The chronic crisis of *laissez-faire* capitalism generated an unprecedented program of government intervention in the private sector, radically transforming the political and economic structures of the United States during the 1930s. This Keynesian approach saw the economy recover slowly, improved the financial system and made it relatively immune to minor financial crises.

Previously seen as part of culture and industry, architecture was reorganized between 1929 and 1945 in the face of the possible collapse of the economic system. This reorganization proceeded through two stages: first, the cultural and industrial sides of architecture were intermingled with extreme economic difficulties so that one was

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comprehensive, multi-layered approach to American architecture and its socio-cultural context. Gwendolyn Wright, *USA: Modern Architecture in History* (London: Reaktion, 2008).

inseparable from the other; second, buildings started to respond to social and economic factors much more quickly and abstractly than before. In other words, in order to survive the whirlpool of massive economic, cultural and political transformations, architecture partook in the consumption and production cycle by tackling the under-consumption problem as its primary social mission. A building became instrumental in directly symbolizing products or was systematically classified to promote mass production of its parts. With these changes, the boundary between industrial and cultural logic started to blur. In short, the economic upheavals of the Depression forced architecture to leave the relatively secure world of art and culture in order to become part of the production and consumption cycles of the economy.

Such an architecture of mass communication was, on one hand, encouraged by corporate leaders who wanted to give their buildings corporate identities and, on the other hand, was further promulgated by industrial designers who at this time were increasingly encroaching on the disciplinary boundary of architects by designing commercial buildings and interiors. Throughout the 1930s, in fact, architects found themselves competing with industrial designers for commissions. Many industrial design firms took on architectural commissions since they were able to hire young and promising architects unable to find jobs at architectural firms. This conflict between the two professions is seen most clearly within the context of the two world's fairs: A Century of Progress Exposition of 1933 and the New York World's Fair of 1939. This confrontation with industrial designers during the 1930s left lasting traces on architecture. Mimicking industrial designers, architects attempted to add extra 'value' to their buildings through streamlined design and by adopting corporate symbols. Buildings were transformed into a means of mass communication when the "mystery" of architectural form was replaced by the transparency of corporate propaganda and by the "marketing" of popular taste by industrial designers. Architecture, which had assumed an elevated ideological position during the early development of capitalism, was now transforming buildings into explicit symbols in order to boost consumption.

Building technology was as decisive as modern forms were to the proliferation of certain ideas or styles in architecture. The logic of mass production and its technology substantially penetrated architecture during the Depression and Second World War years. While the mass production of the house was a social democratic ideal for many modern architects in Europe, it had little to do with social or ideological aspirations on the other side of the Atlantic. The business world first suggested the critical importance of the mass-produced houses to recover the economy during the Depression, recognizing a means of revitalizing production. *Business Week* and *Fortune*, for example, insisted that prefabrication would be critical in creating cheaper homes and thereby stimulating demand and fueling production. Many business leaders and journals understood the factory production of houses to be an industrial and economic issue as much as a cultural issue. Therefore, some architects began to collaborate with housing research groups and concentrated on the mechanization and systemization of construction. These architects did not see this scientific, mechanical approach to building as a threat to their profession, but rather as a chance to increase their social status. However, while the rationalization of a building in a factory helped complete large-scale, emergency projects during the war, the increasing speed of the production and consumption cycle incorporated architecture into the world of commodities.

During the 1950s the destiny of architecture became more tightly intertwined with that of post-Second World War American capitalism. Once the economic, political, and military power of the U.S. became dominant in the world, architecture was, to an extent, ‘freed’ from the tight circulation cycle. The mass production of houses no longer required the active participation of architects. Notably, architecture as an active medium of communication in the 1930s now appeared ineffective in following the accelerating speed of the post-war economic flow. Those cartoonish buildings, which were, in many cases, the direct magnification of products, were now left behind. In their place, architecture offered abstract icons for the corporate world or pure technological embodiments to be re-appropriated. Glass and steel buildings had to create new means of communication through their combination of grid patterns and spatial organization. In the end, a high level of technical and professional efficiency was combined with new abstract glass and steel aesthetics of simple prismatic forms to embody the architectural symbols of the ‘military-industrial complex.’

Architectural historians have yet to fully consider how the discipline dealt with the most serious economic and political crisis in modern American history. What were the transformations during the Depression that had a lasting impact on American architecture in the post-war period? How did architecture position itself within the depressed production and consumption cycle? How did it position itself within the war economy? What were the limits and possibilities of architecture during this time period? This dissertation is not intended, in turn, to provide a set of answers. Instead, this work is meant to widen the existing perspective on the history of modern American architecture and to challenge its canonical historiography.

Recent efforts to reframe architectural history from the 1930s to the early 1950s as part of the socio-political, economic, and cultural transformations of the country show that historical upheavals greatly contributed to constructing the post-war identity of modern American architecture. This identity broadly determined the future trajectory of architectural developments. It demonstrates that postwar American architecture benefited from its own formal and technological experiments as much as, if not more than, from the examples of European modernism. Awareness of this creates more opportunities for building a constructive and discerning history of modern and contemporary architecture.

Importance of SOM as a *Modern* Firm

SOM has an undeniable significance in the history of both modern American and global architecture. The firm stands at the center of various intersections of architectural and sociological discourse. The dominance of modern architecture in the post-Second World War period cannot be told without a sufficient account of several of SOM's projects, which have been recognized as being formally sophisticated and technically innovative. The firm's methods, range of design, and overall operation are at the origins of contemporary corporate architectural practice. The firm is thus an excellent way to position modern American architecture in its appropriate social, cultural and historical contexts.

Besides its historical importance, SOM made critical contributions to the development and proliferation of modern architecture. SOM did not merely appropriate existing building technology or simplify the language of modern architecture in order to mass-produce office buildings and meet the demands of business and government in the 1950s. Alan Colquhoun suggests that SOM was a “new phenomenon in the history of Modernism.”[5] The firm’s contributions to modern architecture were deep and far-reaching. A new concept of architectural practice was introduced based on collectivity. Furthermore, many technical and design innovations were invented by the firm. SOM’s contribution to modern architecture can be classified into three areas: modernization of architectural practice, technical research and advancement, and innovative design.

SOM’s corporate organization was the result of the modernization of the architectural practice. As Karl Marx and Max Weber explain, modernization and rationalization were closely tied to the bureaucratization of society. In architecture, modernization involved efforts to go beyond the traditional method of practice and to establish a collective one. Such efforts can be readily observed in the Deutscher Werkbund, the Bauhaus, and later on, after WWII, The Architects’ Collaborative (TAC). While none of these groups fully overcame the romantic idea of the creative genius, SOM

[5] Alan Colquhoun summarizes the main contribution and historical importance as follows: “The firm of SOM was a new phenomenon in the history of Modernism. For the first time the anonymity that had been aimed by the rationalist wing of the Modern Movement appeared to have been achieved. Thanks to technical and professional efficiency combined with a simple and consistent aesthetic, SOM were able to marry the ambitions of Modernist rationalism with those of advanced capitalism and corporate bureaucracy. In their work modern architecture – or at least a convincing version of it – became normalized within the political structures of the Cold War and the ‘military-industrial complex.’” Alan Colquhoun, *Modern Architecture* (Oxford, New York: Oxford University Press, 2002), 239.

introduced a modernized model of architectural practice. The firm was the first partnership-based practice of modern architecture. This partnership was not like that of the older type in which the partners' names carried significant personal aura to clientele and employees. Accepting anonymity like a medieval guild, the partners of SOM aimed to present the firm as a collective identity, like the brand of a modern corporation such as IBM.[6] Similarly, the entire firm was rationally organized and operated. All important decisions were made collectively and democratically amongst the partners.

SOM also introduced numerous technical innovations. Many of them originated from the firm's participation, beginning in 1939, in the study of prefabrication technology and its application in the construction of various buildings. This experience provided the firm with solid theoretical and technical expertise. Among its many innovations were: the precision of detailing of the Heinz Warehouse and Vinegar Plant (1950-52) and the Chase Manhattan Bank (1957-61); a new relationship between walls and columns seen in the Inland Steel Company building (1956-58) and the Crown Zellerbach building (1957-59), as well as in many others; and long-span modern structural systems such as in the dining hall at the Air Force Academy (1954-62) or the

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[6] In this sense, SOM is fundamentally different from previous large firms such as Holabird and Roche, Burnham and Root and McKim, Mead and White, which went through name changes. SOM fought hard to keep its title intact.

Gunners' Mates School for the Great Lakes Naval Training Center (1952-54).

SOM produced efficient and technically advanced buildings, many of which were groundbreaking in architectural and urban design. Office buildings for Lever Brothers (1951-52), the Manufacturers' Trust Company (1953-54), the Connecticut General Life Insurance Company (1954-57), and the Pepsi-Cola Company (1958-59) were nationally and internationally recognized as among the best buildings of the period. Architects and critics praised the buildings' careful proportions and details. For example, while discussing the importance of Lever House, Jürgen Joedicke wrote, "The search for lightness and transparency had found an answer for the first time."[7] SOM's other offices pursued more sculptural forms of structure on the façades such as at the Inland Steel Company building. The horizontal suburban office building introduced a unique way of organizing office space in a natural landscape. In these buildings, the relationship between inside and outside, and natural and artificial landscapes, was reformulated.

It is important to note that the origin, rise and triumph of SOM in the mid-twentieth century was made possible by its efforts to keep up with society's rapidly changing technical and cultural demands. This process was, above all, a conscious

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[7] Jürgen Joedicke, *Architecture Since 1945: Sources and Directions* Trans. J. C. Palmes (New York: Frederick A. Praeger, 1969), 90.

decision among the leaders of the organization. By tackling some of the most urgent societal necessities for architecture, such as rapid construction of housing, factories, markets and offices, the firm was able to develop sophisticated yet abstract designs, technical expertise in building technology, and an advanced organization. SOM represented the modernization of an architectural practice in America in the middle of the twentieth century.

Structure of the Dissertation

Two terms, organization and abstraction, epitomize this dissertation. The term organization is employed here to indicate a new architectural practice based on a group rather than on individuals. Throughout the dissertation, organization therefore implies a network of professionals and their expertise, bureaucratically organized for architectural practice. It refers to the complex of networks that materialized out of memos, flow-charts, streamlined procedures and rigorous studies of the movements of people and products. Beginning with the Oak Ridge project, then with national branches after the war, SOM decentralized its offices under a unique and unified control system. In this area the partners of the firm also believed a flexible organization would facilitate diversity of architectural design and activities.

The second term, abstraction, alludes to SOM's modern aesthetics. It is related most conspicuously to the sociological, technological and artistic property of an organization and its products. In addition, the work created by multiple and anonymous members of an organization reveals little trace of individuality and thus suggests another kind of abstraction. The rational and bureaucratic nature of interactions in a large corporate organization illustrates the abstract quality of human relations. Abstraction can also originate in the mass-production of standardized parts. The grid pattern of curtain walls, for example, came from the prefabricated homes of the 1930s and the 1940s and resulted from a technological consideration. The technological nature of the glass and steel walls expunges an emotional attachment. SOM's pursuit of spatial flexibility could not be imagined without the abstraction of structure and materiality.

The two decades between 1936 and 1956 are critical to SOM's development. The two terms, organization and abstraction, as well as the relationship between them, allow the firm's activities to be grouped into three different historical periods: from 1929 to 1939, from 1939 to 1945 and from 1946 to 1956. The year of 1929 represents the official beginning of the firm's precedent: the firm of Skidmore and Owings in Chicago. The year of 1956 marks the official retirement of Louis Skidmore from the firm as well as his reception of an AIA Gold Medal the following year. The period between these two years provides the general timeframe for this dissertation. However, it does not define a clear-cut beginning and end. Instead, it is a rough boundary for the project. The historical situation in 1936 was conditioned by the Wall Street crash in 1929. Skidmore and Owings′s future trajectories were formed by the culture of the Depression. While working on the Century of Progress Exhibition in 1933, the two founders learned the importance of industrial design and efficient buildings. In the late 1930s, Skidmore and Owings took advantage of the connections they made with industrialists they had met at the Chicago Exposition of 1933. Their projects throughout this period were mainly exhibitions, interior designs, and small houses.

Shortly thereafter, the firm of Skidmore and Owings changed to Skidmore, Owings & Merrill in 1939 after inviting the Chicago architect and engineer John O. Merrill to join the firm as a limited partner. While Merrill remained only a limited partner for the following ten years, his surname became an integral part of the firm′s title. In 1949, Merrill became a full partner along with four other architects from the New York office. It was at this moment that the modern partnership in architecture was achieved. Officially, the partners were all equal. However, the status of the first two members was not reduced. Owings served as the general manager of the firm while Skidmore served as the spiritual leader. When Skidmore officially retired from the firm in 1956 it marked the beginning of a new era. The fatherly figure as well as the most revered person among its partners was no longer an official member of the firm. With Skidmore's retirement, SOM truly became bureaucratic in the Weberian sense of the term. The firm became a "pyramid with a flat top" as Gordon Bunshaft described it.[8]

SOM thus went through distinctive transformations in the areas of business and specialties from the 1930s to the 1950s. The firm was known as a small design firm specializing in exhibitions and interiors in the 1930s. During the Second World War, it worked heavily on prefabrication technology and its applications in construction. Between 1943 and 1945, SOM dramatically expanded its areas of business and became a comprehensive architecture-engineering firm. After the war, SOM became known to the world as the quintessential modern architecture-engineering firm, actively presenting the image of a sophisticated designer of post-war glass and steel office buildings.

These shifts in SOM's history parallel the chapters of this dissertation. The first three chapters are roughly chronological and the last is thematic. The first three chapters cover the years from 1929 to 1939, 1939 to 1945, and 1946 to 1956 respectively. The fourth chapter deals with the perception of SOM in the architectural community and the

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[8] Gordon Bunshaft, *Oral History of Gordon Bunshaft*, p.121. Charles Perrow made an interesting comment about the top of an organization: "Weber noted long ago, the top of an organization is never bureaucratized. It always belongs to somebody." Charles Perrow, *Complex Organizations: A Critical Essay*, 3rd ed. (New York: Random House, 1986), 18.

organizational characteristics of the firm. In three chronological chapters four general aspects of architecture are emphasized: political-economic, social life and everyday experience, the role of the individual designer, and finally, the architectonic character of buildings. During these periods, SOM dealt with three distinctive political, social and economic situations. The architects of SOM played different roles in each period and developed distinctive relationships with colleagues and clients, resulting in projects that were unique to each time period.

The first chapter, “The Great Depression, Industrial Design and the Origins of SOM,” concentrates on the Depression and its impact on the profession of architecture. The main argument of the chapter is that modern American architecture was critically transformed and reformulated by the economic and social upheavals of the country. Modern American architecture in this period was less influenced by European modernism and more influenced by the economic situation of the United States and architecture’s interactions with industrial designers, who served as new cultural agents for American industry. Architects had to compete with these designers and were highly influenced by them. A Century of Progress Exhibition of Chicago (1933-34) and the New York World’s Fair (1939-40) were essential to the early development of SOM. Skidmore and Owings worked for the Chicago Exhibition as key staff members and learned important lessons that would later become the foundation for their practice. The New York World's Fair enabled the firm to open its second office and to design around twenty projects. In this chapter, many designs and writings by Skidmore and Owings are discussed. In addition, some buildings at the Fair such as the RCA building, Westinghouse building and Venezuela Pavilion are examined in order to explain the relationship between industrial design and architecture in the early activities of the firm.

The second chapter, "'Technologically Modern:' The Prefabricated House and the Wartime Experience of SOM," deals with the experience of the firm during World War II. The development of a prefabricated house, from its initial design and construction to its numerous variations, is the main focus of the chapter. SOM grew from a small design firm to a large-scale, corporate architecture-engineering firm through its wartime projects. It worked with the John B. Pierce Foundation on the advancement and realization of a prefabricated house, which resulted in the construction of thousands of homes. Initially collaborating with the Foundation on a small experimental house in New Jersey, SOM later went on to explore large-scale, highly rationalized construction in two major commissions. At Middle River, Maryland (1941-42), SOM built 600 houses based on the experimental prototype. The housing project gave the firm the opportunity to test and apply their investigations in a domestic environment and to rationalize the prefabrication process. At Oak Ridge, Tennessee (1943-46), built as a part of the Manhattan Project, SOM initially designed and supervised the construction of thousands of houses based on five types and later expanded its boundaries to include diverse buildings such as community centers, schools, hospitals and shopping malls. SOM's rapid mastery of advanced prefabrication technology for numerous building types enabled the firm to provide fast-track, economical construction and to efficiently manage its labor force. It was during this period that the corporate operation, the capacity and size of projects and the complex organization of personnel that characterized the post-war firm were first achieved.

The third chapter, "Flexibility and Abstraction: The Architecture of SOM in the 1950s," examines SOM's post-Second World War buildings. Whereas the very existence of Oak Ridge, and of SOM's considerable achievements, had been kept resolutely secret during the war, SOM now became known to architectural communities, and to the world, as a representative of modern American architecture. The firm built highly visual and diverse types of buildings using modern construction technology. This chapter will focus closely on three buildings to explore the spatial and technical characteristics of the firm's office production: the Lever House (1950-52), the Manufacturers' Trust Bank (1954) and the U.S. Air Force Academy (1956-62). This chapter aims to capture the main characteristics of SOM's later architecture: flexibility and abstraction. These two ideas are well-expressed in SOM's interiors, which aimed at accommodating various programs in a single space. In this case, flexibility is achieved with the help of efficient structural and organizational systems. Careful employment of mechanical and environmental equipment is a precondition for spatial flexibility. Externally, the curtain wall is a critical component to understanding these characteristics. It is also depicted as a mechanism for reconfiguring the relationships between interior and exterior, volume and mass, and solidity and transparency.

The fourth chapter, "Constructing Corporate Architecture: Hitchcock, Wright, Giedion, and SOM," deals with how the firm was theoretically positioned in the history of modern architecture. SOM played an essential role in advancing corporate architectural practices by creating a new type of practice. This chapter describes how the concept of corporate architecture was fabricated and how it later became demonized. The key figures in the chapter are Henry-Russell Hitchcock, Frank Lloyd Wright and Sigfried Giedion. The first half deals with the relationships and interactions of these figures as they embraced the issue of bureaucratization in architectural practice. Hitchcock had a long relationship with SOM and laid a cornerstone in historically constructing the idea of corporate architecture: separating the architecture of bureaucracy from the architecture of genius. Hitchcock appropriated Max Weber's theory on bureaucracy and charisma in order to justify the architectural practice of large-scale architecture-engineering firms in post-WWII America. Wright rebutted Hitchcock's support for the architecture of bureaucracy with an outraged dichotomy between genius and the mob in *Genius and the Mobocracy* (1949). In 1957, Giedion revived this debate by positively evaluating the creative energy and historical importance of SOM. The second half of the chapter describes SOM's organizational developments. The initial establishment of the office, the partnership agreement, and its gradual changes are discussed. Illuminating characteristics of SOM's partnership structure, profit-sharing and welfare system give a glimpse of the partners who built and ran the organization. This chapter also illustrates the historical meaning of the organized practice in architecture.

Despite SOM's considerable architectural, technical and social contributions in its early decades, today it is seen as just one of many other faceless corporate firms. How did this happen? Why has SOM been left out of major architectural discourse and cursed as simply another corporate firm? The lack of an analytical paradigm for such a large architecture-engineering firm is the central reason for SOM's insufficient recognition. In addition, SOM's social success worked against itself in some respects. Its systematic production of design through a highly rationalized organizational structure appeared alien to the conventional discourse of architecture. However, this is the natural evolution of another kind of modern architecture – in fact a *uniquely* modern architecture – rather than a deviation from it. It was thoroughly modern in a way that no individual architect could be. SOM achieved its status while struggling to serve society during the process of unprecedented historical upheavals. Its subsequent evolution reveals the complicated historical interactions of the firm and society during the course of an evolving cultural relationship to the central ideas of modernism.

CHAPTER 1

The Great Depression, Industrial Design and the Origins of SOM

> *With industry off balance during those depression years, conventional procedures in the classical sense of formal practice of architecture were dead.*
> — Nathaniel A. Owings, *The Spaces In Between: An Architect's Journey*, 1973

American capitalism encountered its most serious crisis during the Great Depression and, inevitably, so did American architecture. This crisis occurred after almost three decades of economic expansion capped by seven years of unparalleled boom.[1] Unemployment spread and construction dropped precipitously. Architects gave up their semi-independent cultural role and focused principally on buildings that vividly represented corporate images and products in order to survive the economic hardship from 1929 to 1939. This chapter illuminates how this economic cataclysm reoriented the trajectory of modern American architecture during a transformative period. In this context, the founding and early development of the firm of Skidmore, Owings & Merrill (SOM) is studied.

[1] David M. Kennedy, *Freedom from Fear: The American People in Depression and War, 1929-45* (New York, Oxford: Oxford University Press, 1999), 10-42.

The Great World's Fairs of 1933 and 1939 are surprisingly significant to the appraisal of Great Depression's impact on architecture, specifically in terms of the interaction between industrial design and architecture. As a detailed case study, this chapter reviews the early work of Louis Skidmore (1897-1962) and Nathaniel A. Owings (1903-1984). Skidmore and Owings had worked as Chief of Design and Development Supervisor respectively for Chicago's 1933 "Century of Progress" Exposition. However, the relationship between Skidmore and Owings started several years earlier. Skidmore, a graduate of MIT with a degree in architecture, was travelling across Europe as a result of earning the prestigious Rotch Scholarship between 1927 and 1929. During his travels, he met a fashion design student named Eloise Owings in Paris in 1928 who became his wife two years later. Eliose was the sister of Nathaniel Owings, a Cornell graduate.[2] The brothers-in-law were both born in the state of Indiana, but they looked and acted very differently. Skidmore was refined, shy and quiet, while Owings was almost the complete opposite. Three years after the exposition, in 1936, the two men established a small firm

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[2] Samuel Chamberlain recalled Skidmore of the period. "As for Skid, he settled down with a drawing board in this left bank hotel room and began to finish his measured drawings. I turned the remainder of the advance royalties over to him to help out on expenses. This permitted him to spend a few extra months in Paris, during which time he met an attractive art student named Eloise Owings. This set off a chain reaction. First of all the two young people were married. Skid met his new brother-in-law, Nathaniel Owings an architect too. Then came the Chicago World's Fair where Skid acted as a sort of architectural overload after which the firm of SOM made its debut… I have always thought it fortunate that some of that advance royalty was left over." Samuel Chamberlain, *Etched in Sunlight: Fifty Years in the Graphic Arts*, (Boston, MA: Boston Public Library, 1968), 51.

in Chicago. The next year they opened their second office in New York City which was motivated by the 1939 New York World's Fair, "The World of Tomorrow." For the Fair, Skidmore and Owings designed the largest number of buildings. Shortly after, they restructured their firm and renamed it SOM.

Skidmore and Owings interacted with and learned from industrial designers very actively in the 1930s, particularly at the World's Fairs. The profession of industrial design had gradually gained popularity among industrialists during the 1920s. At the beginning of the Great Depression, industrial designers emerged as critical components to the revival of the economy by enhancing the appearance of products and creating value through design. Their great successes helped the profession earn the trust of industrial leaders and the public.[3] On the contrary, architects experienced extreme difficulty. In the end, the economic maelstrom of the Depression transformed the trajectory of American architecture. Its identity was reconstructed out of the struggle to transform a crisis into new opportunities.

The Great Depression and Architecture

How devastating was the impact of the Great Depression on the profession of

[3] "Both Fish and Fowl," *Fortune*, February 1934: 40+.

architecture? Architects and historians addressed this question in multiple architectural journals throughout the 1930s. One article, "How Many Architects Are Carrying On?," published in *Architectural Record*, provides an objective perspective. It was based on the statistics compiled by the F.W. Dodge Corporation about architectural firms and their patterns of practice from 1928 to 1932 (fig. 1.1). Financially speaking, the general volume of building activities in 1932 was less than one-seventh of what it had been in 1928, down from $5,217,942,800 to $779,022,600. The total number of architecture firms decreased from 9,087 in 1928 to 5,291 in 1932. Furthermore, in the same period the average business volume per office dropped from $400,000 to $95,000. The decline was far greater in 1932 than in any prior year.[4]

This extreme economic hardship left a permanent mark on the development of American architecture. Although isolated architectural events such as the *Modern Architecture – International Exhibition* at the Museum of Modern Art (MoMA) in 1932 might have had some impact, the most significant event that influenced the development of modern architecture, in the United States and elsewhere, was the Great Depression. Architectural historian Talbot F. Hamlin published "The Architect and the Depression"

[4] Thomas S. Holden, "How Many Architects Are Carrying on?" *Architectural Record* (July 1933): 34, 57-58.

on August 9, 1933 in *The Nation*. This was the first of a series of articles about the effects of the depression on various professions. Referring to the report by the F.W. Dodge Corporation, Hamlin detailed the suffering of many architects of the period. Six out of seven architects had lost their jobs and even those who kept a position had to accept trivial commissions to stay in business. Many others turned to different fields, surviving, for example, as salespeople or taxi drivers. Realizing that architectural design and its labor had little economic value to society in the middle of the depression, Hamlin noted that the spirit of architects was “already broken.”[5]

Economic hardship even had a visible impact on architectural forms. Hamlin called attention to two conspicuous and opposite trends: conservative and innovative designs. The use of historical styles was prevalent in many government projects in Washington D.C. In an economically unstable situation, the familiar symbols of stability and permanence were easily preferred to new styles. The second more daring trend was influenced by industrial design. Referring specifically to the Chicago World’s Exhibition buildings, Hamlin complained that, “the style becomes often merely eccentric, extravagant, so entirely divorced from the great architectural problems of plan, material,

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[5] Talbot Faulkner Hamlin, “The Architect and the Depression,” *The Nation* 137, No. 3553, August 9, 1933:152-53.

use, and proportion as to be almost without architectural meaning."[6] Hamlin's stance was quite traditional, but he was correct that all the buildings at the exhibition had moved far away from architectural conventions. By competing for attention, they eschewed architectural meaning. Hamlin rightly understood that both the conservatism of Washington and the festivity of Chicago were "symptoms of exhaustion and despair." They were "escape phenomena, flights from the realities."[7]

This situation was pervasive throughout the profession. Ernest J. Russell, the president of the American Institute of Architects (AIA) at the time, delivered a message about how to survive the financial crisis. "The Architect can no longer wait for opportunity to knock at his door. He must act as an individual, and collectively, in such manner as will bring proper recognition in every case in which the training, experience, and judgment of the Architect are of value."[8] This was the letter published in the official journal of the AIA in January 1933 to celebrate the New Year. Without question, the message shows that the profession was vastly and deeply damaged. Edwin Bergstrom, the treasurer of the AIA, also reflected on the grim situation of the profession: "Never has the

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[6] Ibid, 153.

[7] Ibid.

[8] Ernest John Russell, "A Letter from the President," *The Octagon: A Journal of the American Institute of Architects* (January 1933): 3.

architectural profession, in its distressed financial condition, needed the Institute more, and never has the Institute been more needful of the support of the architects of America."[9] The treasurer became clearer and more intensive in his tone, enumerating issues he thought to be most urgent to the institute and its members.

> During the coming year, it is imperative that certain things be done. We must preserve the Institute's leadership of the architectural profession. We must fight through the economic readjustment which faces our country. The Institute must carry on the work it is doing through its Offices, Divisions, and Chapters, the purpose of which is to maintain the integrity of the architectural profession and to secure for the individual architect that the public and private recognition which is his due.
> We must continue our program to take the government out of competition with the private architect. We must continue to maintain the ideals of professional practice. We must continue to uphold a proper schedule of charges. We must continue to regulate architectural competitions. We must continue, by means of the standard documents, to improve our business practices. We must continue to publish THE OCTAGON, as a monthly message to the individual members.[10]

Each sentence vividly reveals the troubles that architects and the AIA were facing. First of all, the institute was about to lose its leadership among its members because many

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[9] Edwin Bergstrom, "A Letter from the Treasurer," *The Octagon: A Journal of the American Institute of Architects* (January 1933): 4.

[10] Ibid.

members could afford their dues. The normal activities of the AIA drastically dropped. Many architects could not find commissions, proving it difficult to stay in business. Even the institute's monthly journal was in trouble due to lack of funds. The letters of the president and the treasurer portray the efforts of both the institute and the architect to survive the crisis together.

Many historians and critics have thought of the 1932 MoMA exhibition as one of the most important architectural events of the period (fig. 1.2). One of the organizers of the exhibition, Philip Johnson, confessed later that, "The International Style had a longer life, it seems to me now, than ever it deserved."[11] The organizers, Alfred H. Barr, Jr., Philip Johnson and Henry-Russell Hitchcock, were trying to give a positive, even triumphant view of the moment. Barr asserted that the International Style had "already gained signal victories in America,"[12] while Hitchcock and Johnson believed that, "There is now a single body of discipline, fixed enough to integrate contemporary style as a reality and yet elastic enough to permit individual interpretation and to encourage general

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[11] Philip Johnson described the strong impact of the exhibition and the catalogue: "But even though comparatively few people came to the exhibition, its impact was huge in the architecture world. It caused endless discussions and fights within the profession, at places like the Architectural League. And it resulted in big teaching jobs at American universities for Mies van der Rohe and Walter Gropius." Philip Johnson, "Foreword to the 1995 Edition," in Henry-Russell Hitchcock and Philip Johnson , *The International Style*, 3rd ed. (New York: W.W. Norton & Company, 1995), 15.

[12] Alfred H. Barr, Jr. "Preface," *The International Style*, 31.

growth."[13] However, it should be remembered that this exhibition and catalogue took place in the worst year of a cataclysmic economic disaster. It is symptomatic that the catalogue does not have any comment or indication of the profession's dreadful economic situation.[14] While historical styles became less relevant, the industrial-design-inspired styles coincided with the black and white architecture of the so-called *International Style*. We should not presume industrial designers were copying the architecture shown at MoMA. In fact, the success of the International Style depended in part on Hitchcock and Johnson's condemning industrial design as the enemy of true modernism.[15]

Hitchcock and Johnson's *The International Style* is still a popular subject of architectural discourse. It contributed to the characterization of modern architecture through a narrow-minded formalism defined by three characteristics: volume rather than mass, regularity rather than axial symmetry, and no arbitrary decoration.[16] This

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[13] *The International Style*, 36.

[14] Ironically, the exhibition itself was strongly influenced by the Depression. Terence Riley argued, "The financial vicissitudes of the Depression, which plagued the entire curatorial process, exacerbated the discrepancies between exhibition and catalogue." Terence Riley, *The International Exhibition 15 and the Museum of Modern Art* (New York: Rizzoli, 1992), 9.

[15] The initial proposal for Modern Architecture – International Exhibition focused on "nine of the most prominent architects in the world." They were Frank Lloyd Wright, Raymond Hood, Howe & Lescaze, Norman Bel Geddes, Bowman Brothers, Le Corbusier, Ludwig Mies van der Rohe, J.J.P. Oud and Walter Gropius. Richard Neutra was later added and Bel Geddes was dropped. Terence Riley, *The International Exhibition 15 and the Museum of Modern Art*, 104. Refer to Philip Johnson, "Rejected Architects," *Creative Arts* 8, No.6 (June 1931): 435.

[16] Ibid.

oversimplification of modern architecture became so successful that it was employed as a checklist for modern architecture for decades to come. Regarding Hood & Fouilhoux's McGraw-Hill building completed in 1931, Hitchcock and Johnson contended that "the heavy ornamental crown is an illogical and unhappy break in the general system of regularity and weighs down the whole design." In the case of Howe & Lescaze's Philadelphia Savings Fund Society building (PSFS) in 1931, the authors pointed out the lower part, insisting that "the relation of the base with its curved corner to the tower is awkward."[17] Interestingly, they are typical examples of the influence of industrial design on architecture. However, from a purely formal point of view, it is somewhat difficult to differentiate the industrial-design-inspired modernism from International Style modernism. For instance, a white, ornament-free house called House of Tomorrow by industrial designer Norman Bel Geddes in 1932 could be readily accepted as modern, at least in light of its style.[18]

Obsolescence and Accelerated Consumption

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[17] Ibid, 163-64.

[18] Norman Bel Geddes designed the House of Tomorrow in 1932 when invited by Ladies' Home Journal to present his ideas on the home of the future. Joseph J. Corn and Brian Horrigan, *Yesterday's Tomorrows: Past Visions of the American Future* (Baltimore: The Johns Hopkins University Press, 1984), 76.

Despite such polemics, the key to change was not form but production and consumption. In the middle of the Great Depression, Henry Ford contended that, "There is no such thing as overproduction."[19] The industrialist implied that under-consumption caused the economic chaos. Refusing to acknowledge the ruthless competition of the chaotic capitalist system, Ford maintained that the crisis could be solved by accelerating consumption. Many industrial leaders also believed that consumption was a key strategy for escaping the vicious economic cycle. Struggling industrialists insisted that the economy would be normalized by returning to a 'balanced' cycle of production-consumption, the exact view of a laissez-faire capitalist.[20] Rather than government regulation and intervention in economic activities such as in the New Deal, they believed that a certain normalcy could be reached through market competition.

To persuade financially traumatized people to become active consumers again, industrialists had to rely on industrial design. They hoped that new designs would help overcome the under-consumption problem, and most industrial designers agreed that they

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[19] Henry Ford, quote in Roy Sheldon and Egmont Arens, *Consumer Engineering: A New Technique for Prosperity* (New York, London: Harper and Brothers, 1932), 17.

[20] For example, Earnest Elmo Calkins, "Introduction: What Consumer Engineering Really Is," in Roy Sheldon and Egmont Arens, Ibid, 4-6. Calkins, who first employed the term "Consumer Engineering," mentioned the disruption of the market in 1929. In order to stop it, Calkins argued that "curtailing the production of goods is no answer." However, "realizing underconsumption" was.

could tackle the critical mission of recuperating the economy.[21] While industrial designers re-designed consumer products to make them more attractive to potential customers, they were not content providing the market with a one-time stimulus. They went much further, incorporating the concept of obsolescence into their new products. By replacing a crude surface with a new one, designers made the product look fashionable only to make it look old after a certain period of time.[22] Roy Sheldon and Egmont Arens first proposed the concept of obsolescence in *Consumer Engineering: A New Technique for Prosperity* (1932). Obsolescence originally had a negative meaning as something that had become "antiquated, outworn, old-fashioned." Sheldon and Arens explained here that manufacturers

> understand that it [obsolescence] has also a positive value; that it opens up as many new fields as ever it closed; that for every superseded article there must be a new one which is eagerly accepted. He sees all of us throwing razors away every day instead of using the same one for years. He turns in his own motor-car for a new one when there is no mechanical reason for so doing. He realizes that many things become decrepit in appearance before the works wear out.[23]

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[21] Jeffrey L. Meikle, "Plastic, Material of a Thousand Users," *Imagining Tomorrow: History, Technology, and the American Future*, ed. Joseph J. Corn (Cambridge, Massachusetts: MIT Press, 1986), 85.

[22] Nigel Whitely, "Towards a Throw-Away Culture: Consumerism, 'Style Obsolescence' and Cultural Theory in the 1950s and 1960s," *Oxford Art Journal* 10, No.2 (1987): 3.

[23] Sheldon and Arens, *Consumer Engineering*, 54.

The authors acknowledged that obsolescence represented a threat and an opportunity at the same time. It was not enough for manufacturers to increase the speed of the production and consumption cycle. Industrial designers were necessary to perpetuate and accelerate the cycle and to create the myth of value through design. The threat was that design would become part of the expendable commodity, thus leaving little room for independence or any association with permanence. The opportunity presented itself for designers to become the key to industrial development and the economic activities of corporations.

The concept of obsolescence was further developed by consumer engineers. The noted industrial designer Raymond Loewy argued that even if a product is “the most advanced product that research can develop and technology can produce,” it would not always sell well. He proposed that each product has a critical point in which the consumer’s desire for novelty reaches what Loewy calls the ‘shock-zone’. At this level, the desire to purchase the product arrives at a plateau which often results in a resistance to buying the product. Here was the struggle “between attraction to the new and fear of the unfamiliar.” While the shock-zone demands a new design, the public’s taste advances slowly. When a new design is introduced, it should look new and, at the same time, familiar. Otherwise, the design will be rejected by the public. Loewy argued that, at this point, a design could reach what he called the MAYA (Most Advanced Yet Acceptable) stage.[24] A new design should associate itself with previous ones in order to be accepted by the public. Despite some variations according to topography, climate, season, income level and age group, the MAYA stage would be the boundary of acceptable design innovations (fig. 1.3). If the design looked too alien to the consumer, she would not buy the product. The quality of the design mattered little at this moment. He concluded that "the intrinsic value of the design cannot overcome resistance to its radicality at the MAYA stage."[25] To be successful in the market, the design of a product should not go beyond the MAYA stage (fig. 1.4).

Henry Dreyfuss, another industrial designer, proposed a similar concept that he called "Survival Form." Designers intentionally incorporated an 'ingredient' into the product to help consumers associate it with the previous one. This design element or detail of a preexisting product would be seen in "electric toasters, coffee makers, typewriters, and fountain pens." It was a reminder of the past product, the remembrance

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[24] Raymond Loewy, *Never Leave Well Enough Alone* (Baltimore, London: Johns Hopkins University Press, 2002), 277-283. The first edition was published in 1951 by Simon and Schuster. Loewy published the concept in other occasions, one of which was Raymond Loewy, "MAYA," *Idea*: *International Design Annual* (1955): viii.

[25] Loewy, *Never Leave Well Enough Alone*, 280.

of what something looked like (fig. 1.5). According to Dreyfuss, it would give the users of the product "comfort, security, and silent courage." "By embodying a familiar pattern in an otherwise wholly new and possibly radical form, we can make the unusual acceptable to many people who would otherwise reject it."[26] The main function of Survival Form was to help consumers familiarize themselves with a new product, making them feel more comfortable purchasing it (fig. 1.6). Some decorative designs such as a band on the base of a typewriter might be considered for the naïve "purist" to be unnecessary, but the industrial designer believed it would be critical because his field was "the everchanging battleground of the department store rather than the Elysian fields of the museum."[27]

Whether it was called MAYA or Survival Form, the essence of their respective arguments was how to facilitate consumption, what Henry Ford considered the key to ending the Depression. Industrial designers embraced obsolescence and advanced specific methods for developing new designs. Now, design could be an effective instrument to stimulate consumption. As a new weapon, it could shorten the life cycle of products and urge consumers to buy new ones. Helping the economy to escape from the

[26] Henry Dreyfuss, *Designing for People* (New York: Allworth Press, 2003), 59-60. First published in 1955 through the Simon and Schuster.

[27] Ibid, 61.

economic cataclysm, industrial designers fully understood how to maximize consumption with their design techniques. In doing so, the concept of permanence in design was replaced by the extreme temporality of design.

Walter Dorwin Teague, Norman Bel Geddes, Raymond Loewy and Henry Dreyfuss emerged as acknowledged leaders of industrial design in the 1930s. They often won commissions from large corporations that were desperately trying to evade the depression. Since these designers had no ties to the traditional decorative crafts, their roles were not confined to product design. Their influence reached far beyond.[28] As architectural historian Sigfried Giedion would point out, every aspect of design in the mid-1930s focused on re-designing the objects of mass production. “On the one hand the businessman trusts the engineer who knows how a thing should be built,” Giedion said of American industrialists. “On the other, he lends a willing ear to the industrial designer.”[29] The rise of large corporations and industrial design went hand in hand – a point that historians have repeatedly underscored.[30] The profession of industrial design could not

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[28] “Both Fish and Fowl,” *Fortune*, February 1934: 40-98.

[29] Sigfried Giedion, *Mechanization Takes Command: A Contribution to Anonymous History* (New York: Oxford University Press, 1948), 607-11.

[30] Arthur J. Pulos, *American Design Ethic: A History of Industrial Design to 1940* (Cambridge, Massachusetts: MIT Press, 1983), Jeffrey L. Meikle, *Twentieth Century Limited: Industrial Design in America, 1925-1939* (Philadelphia: Temple University Press, 1979) and Donald J. Bush, *The Streamlined Decade* (New York: George Braziller, 1975).

have risen to the level it occupied in the 1930s without the sponsorship of corporate clients (fig. 1.7). Teague's clients included Kodak, Ford, and Texaco; Loewy's were Sears Roebuck, the Pennsylvania Railroad, and Studebaker; Bel Geddes's included Standard Gas Equipment Company and General Motors; Dreyfuss worked for Bell Telephone and New York Central Railroad. Industrial designers designed vacuum cleaners, refrigerators, cookware, radios, clocks, shops, packaging, furniture, office equipment, automobiles, trucks, passenger coaches, railway locomotives and rolling stock, aircraft interiors and ocean liners (fig. 1.8) (fig. 1.9) (fig. 1.10) (fig. 1.11) (fig. 1.12).[31] The range of their designs was nearly limitless as early as 1935.[32]

Industrial designers were more interested in attracting the masses than teaching them. "The industrial designers," wrote Teague, "are supposed to understand public taste and be able to speak in the popular tongue, and because as a profession they are bound to disregard traditional forms and solutions and to think in terms of today and tomorrow."[33] This attitude toward the public often came from earlier training. Teague had worked for

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[31] Jonathan M. Woodham, *Twentieth Century Design* (New York: Oxford University Press, 1997), 68-69.

[32] Industrial designers also systematized their offices. *Fortune* reported, "Yet of all designers his [Bel Geddes's] is easily the most highly systematized shop, the nearest approach among the independent designers to industrialized industrial design. In his drafting room are twenty engineers, architects, and draftsmen; his record-keeping devices defy satire." "Both Fish and Fowl," *Fortune*, February 1934: 90.

[33] Walter Dorwin Teague, "Building the World of Tomorrow," *Architectural Forum* 26 (April 1939): 126-27.

more than fifteen years as an advertising illustrator, Bel Geddes and Dreyfuss had made successful careers as stage designers, and Loewy had become one of New York's leading fashion illustrators. They evolved similar methods of operation and developed the first full-blown industrial design offices.[34] Although they came from diverse fields, most industrial designers worked with a similar aesthetic: streamlining. The American public favored streamlining, which fanned industrial designers' enormous success. They had created and popularized the streamlined aesthetic, literally reshaping cars, trains, ships, and other forms of transportation into teardrops and sinuous curves. In principle, this surface treatment delivered aerodynamic or hydrodynamic efficiency. However, in most such cases, it was merely a visual evocation of machine age modernity (fig. 1.13) (fig. 1.14) (fig. 1.15).[35] Streamlining carried associations with technological precision and efficiency as well as optimism about a unified and smoothly functioning future despite the fact that it made only superficial references to a technological utopia.

Industrial Design as New Architecture

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[34] Meikle, *Twentieth Century Limited*, 38-67.

[35] Sheldon Cheney and Martha Cheney wrote, "We subjectively accept the streamline as valid symbol for the contemporary life flow, and as a badge of design integrity in even smaller mechanisms, when it emerges as form expressiveness." Sheldon Cheney and Martha Cheney, *Art and the Machine* (New York: Whittlesey House, 1936), 98.

All the same, in the early 1930s, a few architectural critics did accept the streamline as a unique expression of American life. Sheldon Cheney and Martha Cheney, authors of *Art and the Machine*, argued that architecture had followed the lead of industrial design in the 1920s and 1930s. They presented several well-known examples of modern American architecture as the 'New Architecture as Industrial Design.' Some of the buildings had been included in the *International Style* exhibition at Museum of Modern Art (MoMA).[36] Regarding this crucial connection to architecture, the authors stated, "under the new way of living, architecture is industrial design. Already it has begun to appear machine-made, most beautifully so where actual industrial designers have stepped over into the once sacrosanct realm of 'the mother art.'"[37]

Many architects set out to defend the discipline in every way possible realizing that industrial designers were their competitors. Rhetoric was the major tool, although they usually ended up addressing other architects who agreed with this point-of-view. William Lescaze, who designed the Philadelphia Savings Fund Society building (1932) with George Howe, insisted that these interlopers did not understand the connection between "content and form." He was outraged that industrial designers like Teague and

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[36] Ibid, 141-79.

[37] Ibid, 179.

Bel Geddes were practicing architecture without studying and mastering the discipline. They should not be allowed to accept such commissions because "a building is not a gadget."[38] Lescaze believed that architects should be the ones to exercise influence. Indeed, Lescaze himself worked as an industrial designer for the Columbia Broadcasting Company. Between 1934 and 1945, CBS gave him a series of contracts to design buildings, interiors, equipment and signs.[39]

We should not be surprised that streamlining was not merely in products for mass consumption. It is quite visible in many skyscrapers from the early 1930s. The PSFS building (1932) epitomizes the impact of streamlining on architectural design (fig. 1.16). The bottom three floors of the building form a single horizontal curve wrapped around two sides of the building (fig. 1.17). Above shop display windows on the first floor is a continuous wall of reflective charcoal granite, broken by a wide band of gall, flush with the surface. The architects carefully designed the surface of the first three floors with smooth curves as not to disrupt the experience of pedestrians. Another example is the McGraw-Hill building (1931) by Raymond Hood (fig. 1.18). This Art Deco style building shows a clear acceptance of streamlining in the design of the entrance

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[38] William Lescaze, *On Being An Architect* (New York: G.P. Putnam's Sons, 1942), 172-75.

[39] Arthur J. Pulos, *American Design Adventure 1940-1975* (Cambridge, MA: MIT Press, 1988), 274.

(fig. 1.19). The top of the entrance emphasizes the horizontality through the repetition of green and brass lines. A light metallic blue on top, cut by bands of dark turquoise, outlined in light blue tubing and split by strips of brass confirms the impact of streamlining.[40] In addition, much like industrial designers, architects of both buildings considered the pedestrian when they designed the ground-level sections. This too was an effort to meet public taste through streamlined design.

Several prominent architects considered partnership with industrial designers. After dissolving his partnership with Lescaze in March 1935, architect George Howe attempted to organize one with Bel Geddes. Howe's reason for the partnership with the industrial designer remains unclear. However, Robert A. M. Stern seems to believe that "[Howe's] concern with the forces that shaped design led him to feel that industrial designers, with their eyes cast in the directions of both the marketplace and aesthetics, were going to play an increasingly important role in the future."[41] Howe must have hoped that working with an industrial designer would allow him to gain the upper hand in the

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[40] Meikle, *Twentieth Century Limited*, 173-74.

[41] Robert A. M. Stern, *George Howe: Toward a New Modern American Architecture* (New Haven: Yale University Press, 1975), 161-62.

tough market. Ultimately, the partnership with Bel Geddes was deemed illegal since the industrial designer was not a licensed architect.[42]

Stern also argues that industrial designers seriously threatened the architectural profession in the 1930s and 1940s.[43] *Architectural Record* hailed the idea as "a new and significant type of partnership."[44] If this partnership had worked, the firm would have dealt with almost all types of design commissions (fig. 1.20). The architect wanted to cover industrial products in his service and not be limited to traditional architectural commissions. Architects and designers alike competed to get the same commissions from corporations and to win the public's attention.

The growing influence of industrial designers was echoed in many architects. While Lescaze criticized industrial designers for not having proper training for

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[42] Helen Howe West, *George Howe, Architect, 1886-1955: Recollections of My Beloved Father* (Philadelphia: The William Nunn Company, 1973), 54-55.

[43] Robert A. M. Stern, "Relevance of the Decade," *Journal of the Society of Architectural Historians* 24 (March 1965): 7.

[44] "New Partnership: Norman Bel Geddes & George Howe," *Architectural Record* 78 (July 1935): 47. The journal writes, "With a fresh outside point of view it sets before the industrialist the needs and demands of the public as related to his established technical and business methods in such a way that he can reach decisions as to products and policy affecting not only a particular problem, but often his whole field of activity. The firm offers service in the following categories of design: consumer research; engineering; production; merchandising; architecture – domestic, commercial, industrial; theatrical; landscape; exterior and interior illumination; household and mechanical equipment; decoration; furniture; accessories; merchandising display; railway equipment; ships; yachts; motor cars; airplanes; theatrical production; setting; stage lighting; stage direction."

architectural practice, a noted architect, Harvey Wiley Corbett, presented himself an industrial designer. He proposed an inclusive concept of design:

> In these days of specialization we are apt to think of industrial design as something very different from other forms of design and therefore requiring a different approach, a different training, or a different technique. But, I think this is wrong…. I am an industrial designer myself…. Design is something generic and all inclusive, not something special and limited to a fixed field.[45]

While Corbett refused to differentiate architecture from industrial design as many architects attempted to do, he ironically presented himself as an industrial designer. By embracing a very broad concept of design, Corbett intended to attract industrial design commissions as well as architectural ones. While this design approach was the result of architecture’s economic situation, industrial designers agreed with Corbett more than architects did.

Teague described industrial design in a similar manner: "a new profession of industrial design came into sudden success, taking the organization of all products as its broad field without specialization in anything but design."[46] An industrial designer was

[45] Harvey Wiley Corbett, quote in Cheney and Cheney, *Art and the Machine,* 178.

[46] Walter Dorwin Teague, *Design This Day: The Technique of Order in the Machine Age* (New York: Harcourt, Brace, and Company, 1940), 33.

not a mere form-giver but seen as a "new coordinator." Rather than being limited to product design, industrial designers should be allowed to mediate between people and products in all kinds of ways. His insistence on this new, much larger role was based on a distinctive conception of design.

> There is, in reality, no compartmentalism in design. A problem in design is a problem in design, whether it has to do with a train, a skyscraper, a national capital, a grinding machine, a housing project or a fountain pen: if the right form is evoked, the same principles and the same approach will obtain in every instance. The only difference is in the specialized techniques involved, and it is far easier to master these techniques than to acquire creative facility.[47]

This inclusiveness did not, in principle, differentiate between a building, a train or a vacuum cleaner. If an attractive form could be found, it could be reproduced in many different fields. Sheldon Cheney and Martha Cheney characterized Teague as "a typical present-day businessman whose business is design, and whose professional pride is in the efficiency with which he manages it." They believed him to be "a progressive conservative who sits in confidential conferences with the world's leading industrialists, practices in collaboration at times with the most successful architectural leaders of the

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[47] Ibid, 225.

period, and does design work which is seen and admired by millions."[48] Like many other designers, Teague was simultaneously a designer of and model for corporate American capitalism.

Bel Geddes expressed a similar idea about design, arguing that, "The principles of designing a building, a painting, music, a poem, or drama are basically the same."[49] He believed that shapes, colors, and textures in visual design were combined into a "structure." For Bel Geddes, a few similar principles covered all works of art. Besides industrial designers' typical concept of design, Bel Geddes also insisted that designers should understand and combine three distinctive positions in the design process.

> The impetus towards design in industrial life today must be considered from three viewpoints: the consumer's, the manufacturer's, and the artist's…. The viewpoint of each is rapidly changing, developing, fusing. More than that, the economic situation is stimulating unanimity of emphasis, a merger of viewpoints.[50]

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[48] Cheney and Cheney, *Art and the Machine*, 69.

[49] Norman Bel Geddes, *Miracle in the Evening: An Autobiography* (Garden City, New York: Doubleday & Company, 1960), 260-61.

[50] Norman Bel Geddes, *Horizons* (Boston: Little, Brown, and Company, 1932), 5.

Industrial designers should consider all three viewpoints together. Their role as consumer engineers was to understand consumers and their changing tastes in order to help manufacturers develop products and prepare for the changing market. The economic situation was the most important factor to industrial design and acted as a synthesis of all three viewpoints. Many architects who emulated industrial designers would take a similar stance on buildings.

The Key Lessons of "A Century of Progress" Exposition

The most intense interactions among industrialists, consumers, industrial designers and architects happened in the Great World's Fairs of the 1930s. The 1933 Chicago Exposition and the 1939 New York World's Fair were the two most influential fairs. In particular, the former allowed Skidmore and Owings to be part of the historical event and to understand industrial designers, consumers and corporate leaders. Through the Exposition, they advanced design ideas and exhibition design skills.

Skidmore, an MIT graduate, was traveling in Europe with the Rotch Scholarship when he heard of the Century of Progress. While in Europe between 1927 and 28, Skidmore met Raymond Hood and Paul Cret. Hood and Cret had different views on the exhibition. Nevertheless, they agreed that Skidmore should be selected as Chief of

Design. The decision came before the onset of the Depression.[51]

Planning for the Chicago World's fair had already been underway for almost two years when Wall Street crashed in 1929. The Exposition had been developed to celebrate the centennial of Chicago's founding in 1833 and to highlight the country's scientific and industrial progress. A board of directors was created in late 1927. Rufus Dawes was elected chairman, and Lenox Lohr, a retired military officer and engineer, became the general manager of the fair. In March 1928, the board of directors appointed five architects: Harvey Wiley Corbett, Raymond Hood, Ralph T. Walker of New York; Paul Philippe Cret of Philadelphia; and Arthur Brown, Jr. of San Francisco. These five architects added three Chicago architects to the commission: John A. Holabird, Edward H. Bennett, and Hubert Burnham, son of Daniel H. Burnham (fig. 1.21). Stage designer Joseph Urban would later join the group as the color consultant, and Ferruccio Vitale as the landscape director.[52]

The major building projects were shared by the architects selected by the board. Hood designed the Electrical Group (fig. 1.22), Cret the Hall of Science (fig. 1.23), and Corbett the General Exhibits Group (fig. 1.24). The Chicago architects designed the

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[51] Alfred Bendiner, "Life in a Martini Glass: Wild Gold Medal Winners I Have Known," *Journal of the American Institute of Architects* 28 (May 1957): 24-25.

[52] Louis Skidmore, "Planning and Planners," *Architectural Forum* (July 1933): 29-32.

Administration Building and the Travel and Transport Building. Bennett and Brown shared the Island, and Hood designed the U.S. Government building.[53] With concerted efforts, the "A Century of Progress" exhibition was extremely successful. There were 22,565,859 paying attendants in 1933 and 16,486,377 paying attendants in the following year; in total, there were more than 30,000,000. Including free admissions, the grand total reached to over 48,000,000 people. It was the largest of any American fair up to that time.[54]

Skidmore and Owings used the fair to train themselves about modern architecture, industrial design and display design. At the same time, they learned how to run a large organization. Owings recalled that acting as Chief of Design, Skidmore "ruled the world of signs and sounds and design quality, maintaining the high quality not only of these items but of his edicts as well." Skidmore closely interacted with the largest corporations, guiding them as they prepared their exhibitions. Owings remembered Skidmore's activities: "The list of chairmen of boards, presidents and executive vice presidents of nationally known companies calling on Skid lengthened, and his power to

[53] Ibid.

[54] Lenox R. Lohr, *Fair Management: The Story of A Century of Progress Exposition* (Chicago: The Cuneo Press, 1952), 48-49.

control their every move inside the world's fair fence solidified and became law."[55] As Chief of Design, Skidmore absorbed the lessons of industrial design and used them to guide the large corporations that had exhibitions. He thus played a critical role in transforming architecture into advertisement. In addition, these contacts allowed him to develop great relationships with his future clients such as Howard Heinz, the president of the Heinz Company. His close relationships with some of the most important industrialists would turn out to be essential to SOM's later success.

When the initial design was completed, Skidmore was transferred to the Exhibits Department.[56] The everyday work of his job did not change much, and the entire scheme of operations was similar to that of "a very large architectural firm."[57] Skidmore had to work with more than five hundred exhibitors. Like his earlier mission as Chief of Design, he had to guide exhibitors on the design of their displays. Exhibitors had to submit "all designs for exhibits for criticism, revision and final approval, in much the same manners as the plans for the buildings themselves were originally handled."[58] By repeatedly performing the same process, Skidmore developed detailed knowledge about

[55] Nathaniel A. Owings, *The Spaces In Between: An Architect's Journey* (Boston: Houghton Mifflin, 1973), 51.

[56] Lohr, *Fair Management*, 114.

[57] Skidmore, "Planning and Planners," 32.

[58] Ibid.

the design and display of products and their settings. He also undertook more architectural issues such as exhibition plans, space division, impact of construction and color treatment. Furthermore, he had an opportunity to learn about new materials and building methods at the Fair.[59]

In dealing with the exposition displays, Skidmore illustrated how the exhibitor, the architect, and the Exhibition Department of the fair could work together effectively. His department would "advise and guide the exhibitor in the design and preparation of his display." It would also regulate exhibitors' activities to a certain degree. Skidmore knew how the exhibitors and the architects would proceed.[60] In addition, Skidmore recorded an interesting change in the teaching and learning relationship between exhibitors and architects;

> Frequently the exhibitor's architect is more tenacious upon traditional treatments than is his employer. He must have pointed out to him how incongruous such treatments would be in the modern setting of this Exposition. Then he forgets about decoration,

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[59] E. H. Bennett, H. Burnham, J.A. Holabird and Louis Skidmore, "A Century of Progress Exposition, The Travel and Transport Building," *Architectural Forum* (October 1931): 449-456, and Louis Skidmore, "The Hall of Science, A Century of Progress Exposition: Details of Structure and Equipment," *Architectural Forum* (October 1932): 361-66.

[60] Louis Skidmore, "Planning the Exposition Displays," *The Architectural Record* (May 1933): 345-54.

> and thinks about the display. He places the units so that they will be visible to the greatest number of observers.[61]

In Skidmore's mind, few architects understood modern settings, concentrating instead on decoration and lacking a sense of reality. Thus, it was architects who needed to learn from the new contexts, and the essence of the learning was the new psychological relations between the world of products and consumers. Skidmore believed the architect had to be a consumer engineer.

Owings initially was the Development Supervisor in the Department of Works and was later assigned to the Concessions Department.[62] Working in these departments, Owings developed extensive knowledge and experience in new materials and building methods. Lohr also remembered that Owings was largely responsible for the organizational work of "Wings of a Century" and "Skyride."[63] Still a young man, Owings came up with some of the most popular items of the Fair, such as the Skyride and Observation Towers: spectacular steel web towers, rising 628 feet (fig. 1.25). Records show that 2,616,339 persons went up the towers and crossed in the cable cars.[64] Owings

[61] Ibid, 356.

[62] Skidmore, "Planning and Planners," 32.

[63] Lohr, *Fair Management*, 173.

[64] Century of Progress Internal Exposition, *Official Guide Book of the World's Fair of 1934,* Chicago, 24.

therefore learned thoroughly the basics of how to create spectacles and attract the public.[65]

The Official Guide Book to the Fair describes the prevailing style of architecture at the exposition as modern and restrained, "unbroken planes and surfaces of asbestos and gypsum board and plywoods and other such materials on light steel frames, rather than a parade of sculptured ornamentation."[66] The architectural focus was less on decoration and more on volumes created by light steel frames and smooth surfaces. However, the use of color compensated for the lack of ornament. Harvey Corbett, Chairman of Architectural Commission, argued that, "ornament, which had had its origin in masonry, could not be appropriately used. Color, brilliantly handled, was the logical substitute."[67] This substitution reached an intense level. *The Official Guide Book* evoked bold splashes of color that "almost articulate with the spirit of carnival, a flaming expression of fun and frivolity which, after all is said and done, is of the very essence of

[65] Nathaniel A. Owings, "Amusement Features of the Exposition," *Architectural Record* (May 1933): 355-62.

[66] *Official Guide Book of the Fair, 1933*, Chicago, 1933, 22.

[67] Harvey Wiley Corbett, "The Significance of the Exposition," *Architectural Forum* (July 1933): 1.

the Fair."[68] Free use of color was one of the most conspicuous aspects of this exhibition, where only one building, the Dairy Building, was painted white (fig. 1.26).[69]

Insisting upon the importance of the expositions on the development of architecture, Skidmore evoked a "sincere effort toward simplicity in the design of this exposition," and elsewhere "toward a healthy expression of naturalness" or "an honest function of the buildings." Finding resonance with the tenets of innovative modern design, Skidmore naturally assumed that there might be "important consequences to the future in the simplicity and cleanness of line in the Fair building."[70] His conclusion about the impact of the exhibition on architecture now appears prophetic:

> No prediction can be made as to the effects of this exposition on pure design of the future, that is, whether it will be all glass and steel; vertical or horizontal; or a combination of both… With the rapid improvement of interior mechanical equipment such as ventilating, heating, air conditioning, interior communication and transportation, and with the rapid obsolescence of location, commercial buildings become outmoded within a comparatively few years. The foundation and structure are built for permanence, involving a large investment that rapidly depreciates. The structure of the 1933 World's Fair buildings offers a definite hope that a

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[68] *Official Guide Book of the Fair, 1933*, 20-29.

[69] *Official View Book, A Century of Progress Exposition* (Chicago: The Reuben H. Donnelley Corporation, 1933).

[70] Louis Skidmore, "Expositions Always Influence Architecture," *American Architect* (May 1933): 78.

> building practice will result that will produce commercial structures which will be designed to last no longer than their mechanical equipment and which will permit of economical demolition.[71]

It is odd to find Skidmore talking about “all glass and steel” in 1932. The architecture firm he co-founded in 1936 with his brother-in-law built some of the best-known glass and steel buildings in the mid-twentieth century. Skidmore’s lesson from the exposition was, quite simply, that buildings could be built to last only in a certain life-span. Skidmore expected that with the help of technological developments in building industry, it would be possible to build and demolish commercial structures more economically. Like production costs in other industries, the construction industry of the 1930s could develop expendable architecture, which would last as long as the building’s mechanical equipment and then be inexpensively dissembled. The impact of industrial design was obvious. As in Loewy’s MAYA and Dreyfuss’s Survival Form, Skidmore imagined a building that could function for a certain program for a limited period of time like a product designed with obsolescence. This meant that architecture would become part of the production-consumption cycle. On another occasion, Skidmore presented his idea of what architecture should be:

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[71] Ibid, 80.

> Certainly this architecture is free from the shackles of the past. It has brought the building and the exhibits it is to house into a close and sensible relationship with each other. The economy of construction, the use of new materials or the new uses of traditional materials, the departures in illumination, the use of color in ways hardly imagined before may forecast a new era in building, an era that lays stress not so much on permanence as on the functioning of a building during its actual life, a building era that forgets the limitations of the past and designs buildings which are basically honest, which express the task they are performing, and which actually perform that task.[72]

The new architecture created a new relationship between content and form. In a quite literal sense, Skidmore's new architecture was an architecture of performance: not permanent, but functioning for a certain period of time. Skidmore conceived of architecture with shortened life-spans, but with high performance.

In January 1936, the firm of Skidmore & Owings opened. One of their first projects was to design seventy-five houses for Frederick H. Bartlett & Co. in Highland Park. The firm had begun designing 20 different low-cost houses in 1935.[73] In August 1936, the president of Armour Institute of Technology announced Louis Skidmore would

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[72] Skidmore, "Planning and Planners," 32.

[73] "Will Build 75 New Homes in Highland Park," *Chicago Daily Tribune*, 8 August 1936, A6. Skidmore and Owings published drawings several months later. However, they were only four types. Skidmore and Owings, Architects, "Low-cost Houses under Construction at Highland Park, Illinois for the Frederic H. Bartlett Realty Company," *Architectural Record* (May 1936): 402-404.

become the director of the department of architecture and a professor of senior design.[74] Armour Institute merged with Lewis Institute to become Illinois Institute of Technology (IIT) in 1940. Skidmore kept this post before permanently moving to New York City to pursue architectural opportunities at the New York World's Fair. Mies van der Rohe took over the position in 1938.

The New York World's Fair of 1939

The United States gradually moved out of the dark years of the Great Depression in 1939. The winds of war fueled production and a new more expansive mood was settling in. Suspended between the Depression and World War II, the New York World's Fair may, in retrospect, look like a daydream or an uncanny festival. Yet it had a logic given that it was organized by a group of prominent businessmen who were worried about the economic future of the city. From their point of view, visitors needed to learn new commercial desires. And so, situated in an expansive open setting at Flushing Meadows, Queens, the fair's architecture merged the streamlined aesthetic with commercial slogans

[74] "Louis Skidmore to Head Armour Tech Architecture," *Chicago Daily Tribune*, 8 August 1936, 11. Ambrose Richardson recalled his excitement as a student to see Skidmore as the new director. Ambrose Richardson, "Skidmore and Owings: The Early Days," *Threshold: Journal of the School of Architecture, University of Illinois at Chicago* 2 (Fall 1983): 66.

and technological innovations (fig. 1.27). As in the case of Chicago, enticing consumers and promoting consumption were key goals for the fair.

The fair was not simply a trade show, but rather a school for the public (fig. 1.28). Educational functions were one of the main concerns for those who prepared the fair. This meant, first, education for commercialism, second, the development of technology, and third, visions of the future fabricated by rapidly growing American companies. New technology proved surprisingly useful to achieve that purpose. Henry Ford, for example, stated that the fair would help people to educate themselves and to pass new knowledge they learned in the fair to others.[75]

The year 1939 was chosen because it marked the 150th anniversary of George Washington's inauguration as the first president in New York City. The fair was incorporated by September 1935 and a large board was formed.[76] Lewis Mumford developed plans for a "Fair of the Future." In May 1936, a seven-member Board of Design including Walter Dorwin Teague was appointed and given considerable power in establishing the fair's architectural style. Louis Skidmore was also appointed consultant

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[75] Henry Ford, "Machines as Ministers to Man," *The New York Times*, March 5, 1939: 70.

[76] Initial incorporation was guided by George McAneny, head of the Regional Planning Association; Grover Whalen, president of Schenley Distilleries and former police commissioner; and Percy Straus, president of Macy's department store.

to the board.[77] Although the group was relatively conservative, the industrial designers such as Teague, Bel Geddes, Loewy, and Dreyfuss were able to make the fair's style more modern or, at least, modernistic through the influence of Teague who was a key member of the board's Theme Committee with Robert D. Kohn.[78] Teague and Kohn further refined the theme and came up with the slogan, "Building the World of Tomorrow." Afterward, the Theme Committee, divided the fair into seven geographic and thematic zones (fig. 1.29).[79]

A Beaux-Arts style plan organized the main exhibit area into a round-point system of radiating streets and fanlike segments. The Board of Design arranged the main exhibit area along Classical lines, with the main axis directly leading to the fair's central theme buildings: Harrison & Fouilhoux's Trylon and Perisphere (fig. 1.30). Approximately 375 structures, including small information booths, were built. About one-third of the one hundred full-scale buildings were built by the Fair Corporation itself.

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[77] Nathaniel A. Owings Archive, Box No.5, Library of Congress.

[78] Eugene A. Santomasso, "The Design of Reason: Architecture and Planning at the 1939/40 New York World's Fair," *Dawn of a New Day: The New York World's Fair, 1939/40*, ed. Helen Harrison (New York: New York University Press, 1980), 30.

[79] *Official Guide Book: New York World's Fair 1939* (New York, 1939), 40. Two of the Zones, Amusement and Government, did not have Focal Exhibits; there were also two Focal Exhibits which, because their related exhibits were housed in a single building, did not have any corresponding zones. The zones and focal exhibits, in alphabetical order, were Amusement, Communications and Business Systems, Community Interests, Food, Government, Medicine and Public Health, Production and Distribution, Science and Education, and Transportation.

The fair opened on schedule on April 30, 1939 with 198,791 paying customers that day. Although the fair attracted forty-five million visitors in its two seasons (1939 and 1940), it closed on October 27, 1940 with a considerable amount of deficit.[80]

World's Fairs were traditionally considered to be places of architectural experimentation because structures, for the most part, were intentionally temporary and the inventions of form and structure were not limited to utilitarian logic. However, most of the critics did not favor the New York Fair's architecture, and many of them felt that the fair's design was overwhelmed by a superficiality of architectural expression.[81] It was believed that designers and architects at the fair were "profoundly ignorant of European artistic achievements" and had only "an intense interest and faith in all types of mechanical and scientific achievement."[82] Architecture critic Frederick Gutheim called the fair's architecture the "Corporation Style."[83] Most of the buildings were concerned with the boosting of sales for companies with buildings there.

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[80] Stanley Appelbaum, "Introduction," *The New York World's Fair 1939/1940* (New York: Dover, 1977), xiv-xvii.

[81] "Foreword," *The Architectural Review, Special Issue* (August 1939): 55. "The World's Fair is now open. The vast resources of money and materials are here, the publicity, the high ideas, the large-scale organization; yet alas the architectural quality of the whole is obviously below the standard of Stockholm 1930 or Paris 1937. The modernity is superficial. The architectural world is no richer for New York."

[82] *The Architectural Review, Special Issue: The New York World's Fair* (August 1939): 62.

[83] F.A. Gutheim, "Buildings at the Fair," *Magazine of Art* 32 (May 1939): 286.

The Board of Design banned conservative styles: "No imitations either of historic architecture or imitations of permanent materials were permitted, with one exception only, namely in the sector devoted to exhibits of the States."[84] The transitory nature of the fair buildings let the designers further free themselves from the burden of designing buildings for future generations. The impact of industrial design on architecture appeared so obvious that some conservative architects simply accepted the aesthetics of industrial design. In part, it came from the design board's contention that a building's exterior shape should symbolize its content and purpose.[85]

The Aviation building by Lescaze and J. Gordon Carr was composed of a semispherical structure that soared above and slightly overlapped a second, low lying structure that resembled an airplane hangar (fig. 1.31).[86] Four airplanes were suspended from the structural supports in the main display area (fig. 1.32). The building evoked both the architecture of aviation and the experience of flight itself. The abstract forms of International Style modernism were transformed into a direct symbolism comparable to

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[84] *Official Guide Book: New York World's Fair 1939*, 26-27.

[85] Santomasso, "The Design of Reason," 35. *Official Guide Book: New York World's Fair 1939*, 25.

[86] Talbot Hamlin, "World's Fairs 1939 Model," *Pencil Points* (November 1938): 675, *The New York World's Fair 1939/1940* (New York: Dover, 1977), 35.

that of the more traditional fair pavilions.[87] Gutheim recognized the building as "probably the best fair-built building" successfully summarizing "the forms of aircraft and airports," while also noting that it was "hardly great architecture."[88] Ely Jacques Kahn and Muschenheim & Brounn's Marine Transportation building was another example of an architecture of communication (fig. 1.33). The building signified its purpose by a gigantic pair of ocean-liner prows and a one hundred foot mast. Eighty foot prows of gigantic super-liners towered at each side of the main entrance and seemed to slice through the building itself. The National Cash Register Co.'s exhibit by Kahn, Teague and Harry Heybeck directly expressed a coherency between content and form (fig. 1.34). This strikingly literal representation was sardonically described as "little more than the world's largest cash register."[89] Kahn, who was known as one of the most prominent commercial architects in New York in the late 1920s, was not interested in the International Style and his previous work shows consistent employment of rich decoration and exotic ornament.[90] However, at the fair, he designed buildings resembling industrial objects.

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[87] Stern, *New York 1930*, 740.

[88] F.A. Gutheim, "Buildings at the Fair," 288.

[89] *The Architectural Review, Special Issue,* 61.

[90] Refer to Ely Jacques Kahn, *Design in Art and Industry* (New York: Charles Scribner's Sons, 1935).

At the fair, streamlined images were combined with associations of speed in automobile company exhibits. Ford and General Motors buildings, for example, were two of the most popular places. The Ford building was composed of a changing rhythmic sequence of elements that featured a garden court, an open-air theater, and a triple-tiered spiral ramp leading to the elevated "Road of Tomorrow" (fig. 1.35). By contrast, the curved walls and rounded parapets of the General Motors Building created a series of seamless enclosing shells (fig. 1.36). Within a cool, inward-turning container, the General Motors building drew people to an exhibition named "Futurama."[91]

Both buildings were the result of a collaboration between the same architect, Albert Kahn, with different industrial designers, Teague for Ford, and Bel Geddes for General Motors. However, in the case of the General Motors pavilion, Kahn's role in the building design was limited to the translation of Bel Geddes's design idea into an actual structure. Bel Geddes provided the architectural design for the building and sent a telegram to Kahn on June 1, 1938 indicating the completion of a building model and drawings for Kahn to look at. His preliminary design was remarkably similar to the final building in program and form.[92] Vittorio Gregotti maintains that, for Bel Geddes, fast

[91] Santomasso, "The Design of Reason ," 36-7.

[92] Barbara Hauss-Fitton, "Futurama, New York World's Fair 1939-40," *Rassegna* 60 (1994/IV): 60.

transportation was the means for solving two problems: urban structure and the style of the century's objects. According to Gregotti, it was not only a matter of giving modern shape to the productive processes inspired by the new technologies, but also establishing a continuity of cultural aspirations between the product and the consumer.[93]

Industrial designers attempted to transform design into a means of publicity using streamlined fantasies. Their works were based on an awareness of industrial production's potential, on the connection between quality and use-value, as though design was a means of increasing value through information.[94] Architects' buildings in the fair appeared nearly indistinguishable from those of industrial designers. In order to direct contemporary American taste, architects transformed buildings into industrial objects.[95]

The dominant symbol of the fair was the Theme Center which consisted of two adjoining structures: a seven hundred foot obelisk called the Trylon and a two hundred foot diameter Perisphere by Harrison & Fouilhoux. The Trylon, a three-sided tower

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[93] Vittorio Gregotti, "Editorial," *Rassegna* 60 (1994/IV): 5.

[94] Manfredo Tafuri and Francesco Dal Co, *Modern Architecture* (New York: Rizzoli, 1986), 216.

[95] *Architectural Review* reported that "The most important contribution of American designers, so far, has been in the field of mechanical equipment, where they have streamlined everything from a pencil sharpener to a railroad train. It is therefore quite typical that, for the European observer, the most startlingly American building is that of General Motors, which is nothing more than a giant blow-up of an industrial designer's clay model…. It is scarcely conceivable that any but an American designer would have designed such a building: it is 'styling' applied to architecture." "The Buildings," *The Architectural Review, Special Issue*, 63.

reaching towards the sky, symbolized, according to the *Official Guide Book*, "the Fair's lofty purpose."[96] The Perisphere, a smooth white globe, sat statically next to the Trylon. The Theme Center was reproduced as a symbol of the fair in almost every possible format.[97] Inside the Perisphere was the fair's theme exhibit Democracity designed by Dreyfuss (fig. 1.37). After riding an escalator from the base of the Trylon into the Perisphere, visitors stepped onto one of two platforms, one above the other, revolving in opposite directions around the interior circumference of the globe. It took six minutes to make a complete revolution. Floating in space, visitors saw images of clouds and sky cast on the dome above them by concealed projectors and Democracity below them. Democracity was a centralized urban scheme of the future about two miles in diameter. It contained business, cultural and leisure activities in low buildings separated by green spaces and connected by pedestrian walkways over streets and highways. It was the city of tomorrow, the pollution free and slum free society of the year 2039. This city incorporated the concept of rigid control, reflecting paternalistic faith in total environmental planning to provide a good, healthy life for all (fig. 1.38).[98]

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[96] *Official Guide Book: New York World's Fair 1939*, 37.

[97] Larry Zim, Mel Lerner, and Herbert Rolfes, *The World of Tomorrow: The 1939 New York World's Fair* (New York: The Main Street Press, 1988), especially Chapter 13, "The Merchandise of Tomorrow: World's Fair Memorabilia," 194-235.

[98] Meikle, *Twentieth Century Limited*, 192.

The most extensive and comprehensive vision of utopian future was embodied by Bel Geddes. Bel Geddes's Futurama was a synthesis of the low-density land use patterns seen in Frank Lloyd Wright's Broadacre City and the gridded skyscraper design seen in Le Corbusier's Plan Voisin (1925) and Radiant City (1930). Just as Le Corbusier organized his city into a grid of superblocks to enhance movement of traffic, Bel Geddes's future city was composed of smooth superblocks, fully developed highways, and wide-open green spaces (fig. 1.39) (fig. 1.40) (fig. 1.41). Futurama was in direct response both to a technological America and to Thomas Jefferson's and Wright's dream of agricultural utopia (fig. 1.42). The exhibition could accommodate 27,000 visitors per day on its conveyor-belt system of easy chairs wired for sound, carrying visitors along on a 1,600-foot, 15-minute trip. After bearing the visitors aloft to look down upon futuristic farms, bridges, and superhighways, the armchair tour entered the City of 1960. The skyride ended with a view of a metropolis with streamlined skyscrapers interspersed between low-rise buildings, parks and more highways (fig. 1.43). The recorded voice told the visitor about "the city of 1960, with its abundant sunshine, fresh air, fine green parkways – all the result of thoughtful planning and design."[99]

[99] Cited from Folke T. Kihlstedt, "Utopia Realized: The World's Fairs of the 1930s," 106. And, *The World of Tomorrow: The 1939 New York World's Fair* (New York: The Main Street Press, 1988) contains some specific images and part of the narratives of the Futurama.

Communication and interconnectivity were strongly emphasized in many exhibits at the fair. The fair attempted to symbolize a new stage of relationship between a city, its buildings and mass-produced goods. Architect Robert D. Kohn, Chairman of the fair's Theme Committee and a member of the Board of Design, remarked that the fair should be something more than a vainglorious exhibition of mechanical achievements. Interactions of many different areas of life were understood as critical to human life.[100] There were efforts to connect all important areas to the modern world as well as to educate the public. He insisted that "the apparent isolation of science, art, commerce, and agriculture would disappear in our plan."[101] Some exhibits of communication technology exemplified this interconnectivity. The telephone, the radio, and the television were repesented. At the American Telephone & Telegraph (AT&T) building, designed by Voorhees, Walker, Foley and Smith and industrial designer Dreyfuss, visitors were randomly chosen to get a chance to make a long-distance call from the Demonstration Call Room (fig. 1.44). A large map of the United States on the wall displayed lights

[100] Robert D. Kohn, "Social Ideals in a World's Fair," in *Culture and Commitment*, ed. Warren Susman (New York: George Braziller, 1973), 298. First appeared in *The North American Review* 247 (March 1939): 115-120. Kohn recalled, "We chose to make our major divisions more or less functional, the things with which the average man comes in contact in his everyday life – food, shelter, clothing, communications, education, transportation, etc. What is more, instead of isolating science and art, the planners would attempt to show them permeating all of these other things, as illustrations of their interpenetration into the functions of modern life."

[101] Ibid, 299.

indicating the places where lucky visitors might make their calls. This visualized interconnection was a symbol of the present utopia, the reachable world with the help of corporate technology. The fair was a daring, captivating, and even unruly beacon of hope in the face of a dawning world catastrophe and the lingering Depression.

Skidmore & Owings and John Moss Associations

While Skidmore and Owings's interactions with industrial designers began with the Century of Progress Exposition in 1930, the New York fair provided a new incentive to bring an industrial designer into the firm. Skidmore and Owings hired John Moss in 1937 in part to get fair commissions. Moss was considered one of the best designers at the Teague office. Skidmore gave him the responsibility of designing all the firm's buildings commissioned for the fair. Moss was so essential to the firm that he was immediately made a partner.[102] The firm of Skidmore & Owings became Skidmore & Owings and John Moss Associates. Skidmore apparently tried to compete with industrial designers by

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[102] Bunshaft remembered the period as follows: "During the World's Fair the firm was Skidmore, Owings, John Moss Associates. John Moss was a man who had worked for Walter Dorwin Teach, and he was very gifted at renderings, especially with an airbrush. He was an attractive man. In fact, he hired me – he and Skid did. Skidmore made him an associate. I guess that's the only way he could get him out of Teague's office. The firm was nothing. You had Skidmore, Owings, but Skid was kind of a designer of sorts, but not much, and Owings was none. Owings couldn't draw water. So that's how the firm started in New York. After the fair, John Moss disappeared. I mean, the thing broke up." Gordon Bunshaft, *Oral History of Gordon Bunshaft*, Interviewed by Betty J. Blum (The Art Institute of Chicago, 2000), 51.

internalizing industrial design into his architectural practice. Bunshaft recalled Moss's design process and the situation of the office:

> It comes later in the story of the World's Fair business. There were nineteen projects going on. John Moss was making renderings of buildings just from dreams. He had no plan, no building. He'd just make a sketch and then he'd start with his air brush and make pretty pictures. It was just like advertising rather than architecture because there was a great rush and we had a lot of work. This went on from 1937 into 1938, and the office was getting crowed.[103]

The impact of Moss on the firm was strongly felt through attractive renderings and exhibition buildings. Skidmore and Owings heavily relied on him in designing the exhibitions and the buildings. He was one of the main reasons why the firm was able to acquire many projects for the Fair and his outstanding rendering skills and design approach influenced people at the firm. Several of the firm's future partners were hired as well. They were later called "Skid's Boys:" Robert W. Cutler (1905-1933), Gordon Bunshaft (1909-1990), William S. Brown (1909-1999), and J. Walter Severinghaus (1905-1987). These young architects would contribute significantly to the development

[103] Ibid, 111.

of the gigantic firm, running it for several decades. Moss, as a main designer, made important decisions in their hiring and had a strong impact on them.

Skidmore was no exception in this case. Skidmore recognized a fundamental shift in the design process that could prove advantageous and perhaps visually appealing. When asked about the firm's fair buildings, Skidmore described the design process as packaging:

> We reverse the usual procedure and wrap the building around the exhibits. That's usually the last step instead of the first. We turn the usual psychological approach to a building plan inside out, working from the angle of the public understanding of the products to be displayed in it and the most dramatic way of housing these products.[104]

In this design process, a building was treated as a wrapper for a program. It is clear that Skidmore fully accepted the lessons of industrial design. By doing so, Skidmore and Owings consciously eliminated the very possibility of architecture as critical art. Architecture was instead to be a mass medium for education, instructing the public about the beneficial impact of technology, consumerism and corporations. SOM's buildings

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[104] Louis Skidmore, quote in "Buildings 'Package' Exhibits," *New York World-Telegram*, February 4, 1939, 12.

were not only functional but were also “supposed to be representative of the product’s relation to living and the life of the community.” Skidmore and Owings’s work comprised “the largest group of buildings designed by any one firm.”[105]

Skidmore also pointed out the importance of “psychological analysis” in designing exhibitions and pavilions. According to him, Americans were freer than Europeans who could be “shunted around at the will of the authorities.” So, each of the exhibitions had to be designed to keep up with American desire to exercise free will. Designers indicated many exits in the buildings so that “the greatest number of people will flow past the exhibits without exercising their privilege of leaving.”[106] Skidmore’s idea is similar to Teague’s. In explaining his works for the 1933 Chicago Exposition and 1939 New York World’s Fair, he explained his exhibition designs and ideas. He summarized the importance of flow in an exhibition.

> We had found that curving walls of this kind of great value in holding the visitor’s interest and leading him on. Usually, if he can see half of an object around a curve, his curiosity will be piqued to see it all, whereas if he is asked to make a right-angle turn he may not continue. People must *flow* in an exhibit. Audiences follow the line of least resistance just as water does, and it is much easier to

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[105] “Buildings ‘Package’ Exhibits,” Ibid. Bunshaft remembered there were nineteen projects going on at the firm. Bunshaft, *Oral History of Gordon Bunshaft*, 111.

[106] Walter Dorwin Teague, “Exhibition Technique,” *The American Architect* 151 (September 1937): 33.

> take them around a slow curve than to make them turn an abrupt corner.[107]

Teague insisted that curving walls were better than walls with right angles because the former would allow people move naturally and without conflicts. It was about flow and at the same time about streamlined forms. Considering Moss worked for Teague for more than several years, it was almost natural to find SOM's building designs were following what Teague described in 1937.

Moss's designs, like other buildings, could be considered reductionist advertising. For instance, the Radio Corporation of America (RCA) Building by Skidmore & Owings and John Moss Associates was shaped like a giant radio tube (fig. 1.45). Television, available for the first time to the general public in the New York metropolitan area, was the most popular feature of the exhibit (fig. 1.46).[108] The front façade of the RCA building implemented a massive glass wall screening an arrangement of television sets. Other exhibits covered facsimile broadcasting, radio point-to-point international communications, marine radio communications, sound broadcasting, recording, and record reproduction.

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[107] Ibid.

[108] *Official Guide Book: New York World's Fair 1939*, 87.

The Westinghouse Company building resembled a huge magnet (fig. 1.47). At the axis of the two exhibition halls, there was the “Immortal Well” for a time capsule, a record of the world of the 1930s’ intended for recovery five thousand years later. “The Battle of the Centuries” was a dishwashing contest between Mrs. Drudge, who used her hands, and Mrs. Modern, who used a Westinghouse electric dishwasher (fig. 1.48). Elektro, the Westinghouse Moto-Man, was the most popular entertainer at the fair. He stood seven feet tall, weighed two hundred sixty pounds, and occasionally appeared with his Moto-Dog, Sparko (fig. 1.49).

The Wonder Bakery was created for the Continental Baking Company, makers of “slo-baked” Wonder Bread (fig. 1.50). The wall was dotted with red, blue, and yellow balloons, suggestive of the bread’s colorful wrapper. Inside, people could watch the bread and Hostess Cakes being baked. In the rear was the only wheat-field that had been grown in New York City for over fifty years. The building for Swift and Company looked very much like a frankfurter or a streamlined ark with a crew of hams and sausages aboard (fig. 1.51). This direct symbolism or architecture of mass communication did not achieve any formal, spatial meaning. They easily devolved into signs without meaning.

The Venezuela pavilion looked slightly different from other buildings by the firm (fig. 1.52). The building was square with glass walls and no doors. It was not for a private company, but for a country. The theme of the exhibits was the modern, progressive life, industry, and art of Venezuela. The architects lifted the roof off the building in order to transform the ceiling into one gigantic mural depicting "scenic beauties and products."[109] Skidmore explained this process: "We want to draw the people into the buildings by a display that appeals to them even from the outside… The psychological reaction of any passer-by would be to go in and see what it's all about."[110] It is clear that buildings became nothing but gadgets or large signboards for attracting spectators. Like the industrial designers, to direct contemporary American taste, Skidmore and Owings & John Moss Associates transformed their buildings into a means of mass communication. Most of their works envisioned design as a means to enhance value through extra information. Designers of the firm concentrated on direct symbolism. A building became what it served.

When the fair was over and the firm needed a new project, Owings sent a letter to his friend, James A. Gloin, assistant general manager of L.S. Ayers Department store in Indianapolis, Indiana, with hopes of finding a new commission. He specifically

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[109] *Official Guide Book: New York World's Fair 1939*, 149.

[110] Skidmore, "Buildings 'Package' Exhibits," 12. Joan Ockman provides a different reading of the project. She argues this anticipated "the elegant integration of architecture and art in his [Bunshaft's] postwar work." Joan Ockman, "Art, Soul of the Corporation: Patronage, Public Relations, and Interrelations of Architecture and Art after World War II," *SOM Journal* 5 (February 2009): 181-82.

expressed an interest in becoming either consultants or the "architects and interior designers." Owings wrote:

> I think that you know we have been concentrating our attention on the study of the best methods of merchandising ideas and products from the three dimensional presentation point of view. We have had ample opportunity in connection with our Fair work and Exhibit work and permanent jobs to study public reaction and how to properly present the product to create a favorable reaction….This involves a lot of angles, only a part of which concerns architecture.[111]

In the single-page letter, Owings clearly summarized how the firm had evolved in its early years (fig. 1.53). Under the enormous pressure of the Great Depression, Skidmore and Owings developed an entirely different psychology as architects. They became specialists in presenting ideas and products to the public. They studied how to create a favorable public reaction with presentations and exhibitions. Like industrial designers, they became efficient consumer engineers. In this sense, the firm of Skidmore and Owings was a direct product of the Depression, fundamentally different from other architectural design firms in that it fully internalized the lessons of industrial design and

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[111] Nathaniel A. Owings, Letter to James A. Gloin, 4 March 1939, Nathaniel A. Owings Archive, Oversize Box No.9, Library of Congress.

product exhibitions. Replying to Owings letter, Gloin admitted that the traditional practice of buying products and retaining them for a long period of time was over. Architects and interior designers had to be "more sensitive to merchandise trends as well as consumer habit." He praised SOM's achievement, declaring "your organization is certainly on the right track in casting aside some of the more traditional ideas in favor of emphasis on better display of the merchandise itself."[112] Soon after this letter, the department awarded SOM an "extensive remodeling" job including a small restaurant in the basement, new elevators, and other interior works. Through this work, the firm developed expertise that led to commissions for "the Charles Stevens store and Marshall Field and Company in Chicago and the latter's subsidiary, Frederick Nelson in Seattle" before World War II and Marshall Field's, Goldwater's in Phoenix and H.S. Manchester in Madison, Wisconsin after the war.[113]

The February 1947 issue of *Architectural Record* published Owings's article, "Economics of Department Store Planning."[114] In the article, he attempted to present a

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[112] James A. Gloin, Letter to Nathaniel A. Owings, 13 April 1939, Nathaniel A. Owings Archive, Oversize Box No.9, Library of Congress.

[113] Ambrose Richardson, "Skidmore and Owings: The Early Days," 70.

[114] *Architectural Record* recognized SOM as a leader in the scientific planning of department stores after World War II. Nathaniel A. Owings, "Economics of Department Store Planning," *Architectural Record* 101 (February 1947): 86-91.

"science of department store planning" with an example by SOM: Goldwater's new fashion department store in Phoenix, Arizona. He contended, "The exterior, as well as expressing a personality very much in harmony with local determinants, evolves naturally from a precisely studied functional interior, where departmental groupings and inter-relationships are organized on the preferred horizontal basis."[115] Owings concluded the article insisting that emphasis on the design of department stores would shift from "'interior decoration,' and unproductive doodling, to an architectural treatment progressively subordinate to the main issue – merchandizing and customer service." [116] It is not hard to see the connection between SOM's activities in the 1930s and this article. It is not a coincidence that John Moss was at Marshall Field's. After the New York Fair, John Moss left the firm whose title included his own name. He joined the Marshall Field's department store as chief designer where he became recognized for lighting implementation and supervised the design of all of the department's stores.[117]

In October 1939, a Chicago newspaper reported that John O. Merrill (1896-1975), an architect of the Federal Housing Administration for Illinois, resigned to form a

[115] Ibid, 86.

[116] Ibid, 91.

[117] Richard Marsh Bennett, *Oral History of Gordon Bunshaft*, Interviewed by Betty J. Blum (The Art Institute of Chicago, 1991), 37.

new partnership with Louis Skidmore and Nathaniel A. Owings, which was to be renamed, Skidmore, Owings & Merrill. [118] Merrill, an MIT graduate, had previously worked for a Chicago firm, Granger & Bollenbacher, and had served as president of the Chicago chapter of the AIA during 1936 and 1937. The addition of this engineer-architect to the small design firm was beneficial to the great fortune of SOM's future. When John Moss left and John Merrill joined, the change opened up new avenues for the firm. The transformations of SOM began with a small prefabricated home in 1939.

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[118] "Merrill Quits FHA; Joins New Design Firm," *Chicago Daily Tribune*, October 29, 1939.

CHAPTER 2

‘Technologically Modern:’

The Prefabricated House and the Wartime Experience of SOM

> *The essence of this large-scale organization of the late twentieth century is that within it people of very diverse skills and knowledges work together. This, traditionally, could never be done except in very small groups, teams of four or five at most. Today we do it – or at least try – with very large numbers – thousands of people with different knowledges, coming together in a business, a government agency, or an armed service – under a management with specific knowledge of building and directing the large-scale organization. This newly gained ability has given man great new capacities, for better or worse. The atom bomb was much less a triumph of science than a triumph of organization.*
> — Peter F. Drucker, *Concept of the Corporation*, 1972

Many critics have condemned mid-twentieth-century American architecture as a degeneration or debasement of European modern architecture, especially during its high point in the 1910s and 1920s. They have asserted that the dominance of corporate and consumer culture prevented authentic modern architecture from transplanting onto American soil. One such critic, Colin Rowe, contended that “purged of its ideological and societal content,” modern architecture in the United States was reduced to being either a "*décor de la vie* for Greenwich, Connecticut," or the "suitable veneer for the corporate activities of enlightened capitalism."[1] In sum, utopian visions of social transformation through modern architecture became mere fashions in the United States; empty ornaments for corporate America devoid of all content.

There are two fundamental flaws in Rowe's narrative of good architecture turned bad as a result of corporate culture and consumerism. First, European modern architecture was never unified and monolithic. The perceived similarity downplays major differences, particularly fundamental political and economic differences in Europe. Second, post-Second World War American architecture was influenced as much, if not more, by wartime technological experimentation as by European modern architecture of the interwar period. While the first has been discussed by many historians, the second has never been appropriately recognized. Therefore, this chapter attempts to explain the mechanization and systemization of building and its impact on building technology and expression. Through this analysis, I will later argue that post-war curtain-wall technology and its expressions came from wartime technological experimentation.

Rowe's comment about American corporate architecture has often been associated with the firm that became Skidmore, Owings & Merrill (SOM) in 1939.

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[1] Colin Rowe, "Introduction," *Five Architects* (New York: Wittenborn & Company, 1972), 4.

Indeed, SOM has long been considered the epitome of a so-called ‘corporate modernism.’ Historians and theorists readily criticized the firm for a commercialized modern architectural language that simply seemed to please its post-WWII clientele, namely large corporations and government agencies. This kind of critique claims to expose a purposeful distortion of modernism’s original goals, including its engagement with modern technology. By refraining from such formal analysis we will find that SOM embraced modern technology both before and during the war. Indeed the firm experimented with materials and production processes in innovative ways, especially during World War II.

William Hartmann, an early partner, argued that, while the New York World’s Fair of 1939 was a watershed in SOM’s early history, it was the war that enabled the firm to become a large-scale modern organization. The critical moment would come in 1942 when SOM was selected to design the city of Oak Ridge, Tennessee.[2] However, the necessary foundations for this herculean task occurred between 1939 and 1945. Applying

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[2] William Hartmann, *Oral History of William Hartman*, Interview by Betty Blum (The Art Institute of Chicago, 2003), 71-72. Recalling the importance of Oak Ridge, Hartmann argued that “SOM had the capability of dealing with almost any kind of project, whether it be a school or a hospital or a house or prefabrication or anything. The organization had capability. SOM became a large organization. I don’t recall the numbers, but I’m sure it was in the thousands. That includes city planning. They made the town plan of Oak Ridge… It accumulated some people of great talents. Walter Netsch was hired to work on Oak Ridge. John Merrill really came in about that time and became the head of the Oak Ridge effort in Oak ridge. Many other people–engineers, architects, and all kinds were grouped together in that effort. That established the spirit of SOM as a professional organization.”

the lessons of modern building materials and technology from the World's Fairs, SOM joined forces with the John B. Pierce Foundation to explore research and new construction systems for prefabricated housing. This collaboration began with a small 'Experimental House.' The first prototype and subsequent collaborative projects gave SOM the technical knowledge and on-site experience that would prove essential to carry out large-scale military, government and corporate commissions. This period prior to the war prompted significant changes in SOM's business practices and organizational systems as well as formal topologies. Thus, SOM's architecture in the 1940s and 1950s began with the vision of a house: the house of mass production.

The Vision of the House: Flexibility and Abstraction

When the United States officially entered the Second World War in December 1941, the battle was already being waged in distant battle fields and at home. The domestic front transformed the country into a highly effective supply base for materiel and basic resources. The tempo of everyday life accelerated as war production injected a sudden surge of energy into the industrial economy still stagnant from the depression years, and Americans began to feel a sense of common purpose. The new speed generated by the war and the booming wartime economy would permanently transform architecture as building production became more systemized and formal prototypes more standardized. These processes crystallized sufficiently to compete with conventional production and ultimately guaranteed the postwar predominance of American architecture in the world. For example, standardized wartime housing production laid the foundation for postwar suburbia and urban apartment buildings. The prefabrication techniques used for wartime housing also provided the basis for post-war curtain-wall structures. The Pierce Foundation and SOM were crucial to both the prefabrication of a building and the development of the curtain wall.

This was by no means a surprise. Recognizing that there would be a major shortage in civilian housing, architectural journals anticipated a vast and sudden increase in postwar production. Prefabrication technology would allow this to happen. The September 1942 issue of *Architectural Forum*, “The New House of 194X,” exemplified this way of thinking. The journal took on the question, “How can the House of 194X be made the most-wanted commodity in the competitive postwar market place?” As did many other journals, *Forum* engaged the imminent market situation in which mass production through systemization and mechanization was supposed to take over traditional architectural production. The journal invited thirty-three architecture firms to present their ideas on the standardization and systemization of housing production. One of these firms was SOM, whose article was ironically entitled “Flexible Space.”[3]

“Flexible Space” began with a formula based on the principal elements of a building. (fig. 2.1) (fig. 2.2) (fig. 2.3). Geared towards industrial mass-production, the formula also allowed for a variety of combinations for adapting the prototype to the particular requirements of the occupants. The SOM text stressed that “every family is different” and “every family changes.” Calculating both the most efficient system of production and the particular needs of each family, the house and its parts became flexible.[4]

While most of the other proposals were practical, SOM concentrated on a fairly abstract idea of space. In essence, architects of SOM theorized the flexibility of a spatial system. The goal was to construct a formula for spatial organization in which a building would be a collection of disassembled parts and dividable functions. Using a crude linguistic model, SOM subdivided architectural production into three stages. The first stage, “Vocabulary,” referred to the shell or enclosure of a space, its practical units, wall units and mobile units. Second, “Grammar,” or the “functional relation of vocabulary,” was a process of combining shell and utilities in order to create spaces that successfully

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[3] “The New House of 194X,” *Architectural Forum* (September 1942): 100-03.

[4] Ibid, 102.

met visual, acoustical and atmospheric requirements. “Grammar” would satisfy the diverse demands of each occupant. The final stage was “Composition” which clarified the possible variations of the spatial system based on certain prototypes.[5]

“Flexible Space” had little to do with materiality, technology, context, or even space. Flexibility was a conceptual system that could combine with anything else. It was a state of neutrality. The key to its notion of flexibility was the abstraction with which mass production and reproduction would achieve their projected economic and technical goals. This abstraction could originate from the technical nature of spatial flexibility or from the visual characteristic of individual units of repetition. The difference was only from how you approach the building, either from outside or from inside. The abstraction could then generate countless minor variations. Thus, “Flexible Space” prefigured today’s mass customization.

The John B. Pierce Foundation and the Experimental House No.2

The idea of “Flexible Space” came from SOM’s previous experience with prefabricated housing research. From 1939 on, the firm was entirely devoted to researching the prefabrication of houses and related technological issues. They worked in collaboration

[5] Ibid, 100-03.

with the John B. Pierce Foundation, one of the most well-known prefabrication research institutions. However, the first opportunity for collaboration came unexpectedly. SOM worked with many corporations designing buildings and exhibitions for the New York World's Fair of 1939. SOM developed close relationships with Joseph F. O'Brien of Westinghouse since he took charge of preparing the 1939 exhibition pavilion of the company. At the end of 1938, O'Brien decided to leave Westinghouse and join the Pierce Foundation as Director of Electrical Research where he soon became General Manager.[6] O'Brien was instrumental in hiring SOM as consulting architects for the foundation's prefabricated house project. This prompted a short, yet intensive period during which SOM accumulated expertise related to prefabricated housing technology and subsequently systematized its architectural language.

The Pierce Foundation's research on prefabrication was previously spurred by the Great Depression. Prefabrication would attract much attention from businessmen and architects in the 1930s as a means for reviving the building industry.[7] *Fortune* magazine, reporting on the nation's housing problems in 1932, concluded that prefabrication was "the greatest single commercial opportunity of the age." Recognizing the importance of

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[6] *New York Times*, November 12, 1938, 26.

[7] Alfred Bruce and Harold Sandbank, *A History of Prefabrication*, 2nd ed. (New York: Arno Press, 1972), 7. The John B. Pierce Foundation published the first edition of this book in January 1944.

prefabrication in economic reasoning, the article presented a distinct and fresh concept of design. Design was not an aesthetic issue, but an industrial one. Accordingly, "design will dictate the form of thousands of units instead of the form of one," as was the case with the automobile industry.[8] Therefore, the traditional concept of a house as a unique cultural entity must recede to economic priorities.

The Pierce Foundation also took up the challenge of mass production of houses. Established almost a decade earlier, in 1924, by John B. Pierce, then Vice President of the American Radiator & Standard Sanitary Corporation, the original goal was "educational, technical and scientific work in the general fields of heating, ventilating, and sanitation."[9] From its inception, the foundation declared that it would focus on the physical and physiological human environment. The Housing Research Division was then set up in New York in 1931, with the Harvard-educated architect Robert L. Davison as the first director. Davison was a well known specialist in prefabrication, with experience in many parts of the country. The Foundation was interested in multiple other areas as well. In 1933, it established another division: a separate Laboratory of Hygiene in New Haven, Connecticut that specialized in physiological problems in the domestic environment. The

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[8] "Five Questions….. And a Striking Answer," *Fortune*, July 1932: 61.

[9] Bruce and Sandbank, *A History of Prefabrication*, 11-12.

supervisor C. E. A. Winslow, who was then head of the Department of Public Health at Yale University, has often been regarded as the father of the public health program in the United States. The Pierce Foundation researched prefabricated housing, the scientific analysis of spatial use, and physiological and psychological reactions of people in the domestic environment. These were intended to complement each other even though prefabrication was to some extent the lynchpin, seen as the outcome of a scientific understanding of the individual, family life, and the industrialized building. However, prefabrication did not necessarily mean standardization for the Pierce Foundation. On the contrary, it was seen as a precondition of flexibility.

The foundation erected its first prefabricated house in 1932 (later named 'Experimental House No.1') on top of the Starrett-Lehigh Building in New York City. Numerous types of material for structural and enclosure purposes were tested.[10] The Foundation did not publicize the experiment nor did they develop detailed research projects. Seven years later, with the construction of its second prefabricated house, the Foundation took an active role as a leader in prefabrication research and production. SOM began to work as consulting architects with the foundation. The second house, 'Experimental House No. 2,' was built in 1939 (fig. 2.4) (fig. 2.5). SOM architect J.

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[10] Ibid.

Walter Severinghaus was appointed supervisor for construction and design improvement of Experimental House No. 2. The house was built in Lebanon, New Jersey, the site of Joseph O'Brien's farm. It was a single story house with a pitched roof and a porch with windows. The plan was a box divided into two bedrooms, a living room, a bathroom and a kitchen-dining room. The main building material was prefabricated plywood without insulation. Immediately after the completion of the Experimental House No.2, SOM developed variations of the prototype with changes in orientation and two types of garages. The foundation then decided to build ten more houses with SOM's exterior variations (fig. 2.6).

In October 1940, *Architectural Forum* commissioned SOM to study the materials it had collected from builders on prefabricated housing in order to present "a basic house design" which was to include the merits of individual house plans (fig. 2.7). The following month, *Architectural Forum* published an article, "The Architectural Forum Defense House by Skidmore, Owings & Merrill, Architects.," which included SOM's drawings with annotations. The basic intentions of the project were to present an economical house, to examine the various prefabricated houses available in the market, and to provide manufacturers with a standard model of the low cost dwelling unit.[11] The

[11] "The Architectural Forum Defense House by Skidmore, Owings & Merrill, Architects." *Architectural*

article insisted that SOM's house would meet all the general conditions for a low-cost house including the fact that it was flexible and repeatable as a prototype in any context.

SOM's "Plan Selection and Orientation" diagram reveals characteristics of the firm's approach that would later define their large-scale projects (fig. 2.8). The detailed yet abstract diagram was easy to use and applicable anywhere. Analyzing various four-room prefabricated houses, the architects of SOM found only two types of floor plans: one with the bathroom between the kitchen and a bedroom and the other with the bathroom between two bedrooms. The SOM team chose the first plan as the basis for their housing research because, firstly, it economized the plumbing by putting the kitchen and bathroom back to back, and secondly, it permitted greater flexibility in the shape of the house and its orientation. As shown in the figure, eight variations were created from the first plan. Each plan could then be used for certain orientations that could be readily installed in various possible locations according to the diagram. The firm developed the diagram based on such as factors "winter sun and summer breeze on the living room, and kitchen exposures." The diagram was devised to find "the best possible plan for a given site, determine the direction in which the site faces, plot this direction on the chart, judge which of the plans is nearest the line." This simplified, scientific diagram could

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Forum (November 1940): 444.

supposedly be employed in “most parts of the U.S.” although “it should be adjusted to local prevailing wind conditions” and “to sun conditions” of the extreme south.[12] Thus, with the eight variations and the diagram, SOM made low-cost housing development easily calculable. The detailed drawings for individual houses aiming at diversity and flexibility confirm SOM’s systematic approach to architecture.

John H. Callender, a key member of the Pierce Foundation, later wrote a technical resource book on architecture, *Time-Saver Standards: A Handbook of Architectural Design* (1966). This was, to some extent, a continuation of his previous work proposed in a booklet titled *Introduction to Studies of Family Living* (1943). Callender argued that “housing design should be based on family needs. The problem was how to obtain the data on which to base a design for housing not one, but several thousand, families.”[13] Callender’s argument confirms that an interest in creating variety through mass production was the underlying theme in the Foundation’s research, which in turn suggests that SOM’s “Flexible Space” was a continuation of the Foundation’s research. The research program on family life was highly influenced by a sociologist, Svend Riemer, who had worked with the Swedish Cooperative Building Society.

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[12] Ibid.

[13] John H. Callender, *Introduction to Studies of Family Living* (John B. Pierce Foundation, 1943), 5.

Riemer's research, called the 'Stockholm Study,' was a continuous record of the activities of each member of a Swedish family. More than 200 families were studied through interviews and on-site sketches of the interiors of their home in order to closely analyze how people interact with others and their domestic built environment. After thorough research, Riemer proposed a new concept of design. Presenting a paper at the Milbank Memorial Fund Annual Conference in New York City in 1939, he contended:

> All too often the designer views the home in its static aspect only. He considers it as comprising so much space with so much furniture, neglecting the fact that it is the setting for many diversified activities of the family and its individuals, occurring in continuous flow and often conflicting… in space and time… Design is a problem of conflicts in space and time.[14]

Like Riemer, Callender and SOM understood the issue of design as "a problem of conflicts in space and time." For them, design was far more than an issue of style or aesthetics. (fig. 2.9) (fig. 2.10) (fig. 2. 11) (fig. 2.12) (fig. 2.13).

Hoping to resolve conflicts in family living, Callender suggested analyzing

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[14] Svend Riemer, quote in John H. Callender, Ibid, 8. Riemer's paper was later published. Svend H. Riemer, "Family Life as the Basis for Home Planning" in *Housing for Health: Papers Presented under the Auspices of the Committee on the Hygiene of Housing of the American Public Health Association* (Lancaster, Pennsylvania: Science Press Printing Company), 1941.

housing design in terms of three categories: space, equipment, and environment.[15] Space was measured by the physical occupation of a person and equipment around specific items such as a chair, a table or even a mirror in the domestic space. The environment was subdivided into physiological and psychological measurements. The physiological environment included control of moisture, heat, ventilation, light, sound, and sanitation. The psychological environment incorporated control of privacy, consideration of the general appearance, and impression of the space and equipment as well as aesthetic preferences and social standards. In this process, design did not begin with physical walls and their shapes, but with "a human and wrapping around him with the required space, equipment, and environment."[16] The objective spatial measurements of human activities and the development of various furnishings were crucial aspects of the design process (fig. 2.14) (fig. 2.15). In contrast, the style of a house could be "fairly conventional – possibly even Cape Cod Colonial," thereby taking into account aesthetic preferences and social standards.[17] SOM would explore this concept of design in its work with the Pierce Foundation.

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[15] Callender, *Introduction to Studies of Family Living*, 12-13

[16] Ibid.

[17] Ibid, 15.

The Housing Project for the Glenn L. Martin Bomber Plant

On October 7, 1941, a group of businessmen, government officials and reporters gathered in Baltimore to celebrate the completion of a housing project for the employees of the Glenn L. Martin Aircraft Company. The event was followed by a visit to Middle River, Maryland where Stansbury Estates, a 300-unit housing project, had just been completed and a second 300-unit housing project, Aero Acres, was under construction (fig. 2.16). Bror Dahlberg, president of the Celotex Corporation, and Joseph F. O'Brien, then serving as the general manager of the Pierce Foundation, made speeches focusing mainly on their respective roles in the construction of the projects. While the Pierce Foundation and the Celotex Corporation were indeed central figures in these housing projects, SOM played a significant role in their realization (fig. 2.17).[18] The firm acted as the primary architect for the project, creating general plans and specific technical drawings for the construction. The prototype for these housing projects was the Experimental House No.2 that the firm had developed in collaboration with the Pierce Foundation in 1939.

The Glenn L. Martin Aircraft Company housing project was initially conceived as part of the expansion of the 1929 Martin aircraft plant in Middle River, Maryland originally designed by Albert Kahn and Associates. Wartime production entailed a

[18] Speeches on "The Cemesto House" by Bror Dahlberg and J.F. O'Brien, *A Vital Contribution* (Chicago: The Celotex Corporation, 1941).

dramatic increase in aircraft bombers which, in turn, boosted personnel from a peacetime number of 17,000 employees to 45,000 at the end of 1941.[19] Expecting that the influx of war workers would worsen the already dire housing situation of the city of Baltimore, the company decided to finance and construct its own housing development. For this task, Martin organized the Stansbury Manor Corporation, a subsidiary to be managed by the designer-builder Jan Porel who had completed a 185-unit garden apartment project at Middle River three years earlier.[20] In an effort to find the best in low-cost construction techniques, Porel compared thirty-two types of construction methods out of which the Pierce Foundation's method used in the Celotex's Cemesto House was ultimately selected.[21] The shape of the Cemesto House was identical to that of the Experimental House No.2. The only difference was the materials. Rather than plywood, it was made of a new building material called Cemesto, a product of the Celotex Corporation (fig. 2.18). In order to first prove the efficiency of the construction method and the durability of the Cemesto House, the Pierce Foundation and Celotex built a one-family and a six-family house based on their previous experiments, specifically the project at Lebanon, New

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[19] "Building for Defense," *Architectural Forum* (November 1941): 335-37.

[20] "Houses for Defense," *Architectural Forum* (November 1941): 321-22.

[21] *A Vital Contribution*, 7.

Jersey. The latter proved to have some technical problems, while the former appeared so durable and attractive that the Martin company decided to build 600 identical houses on both sites within walking distance of the bomber plant in Middle River, MD.[22]

The Martin Aircraft Company house was a compact, rectangular, four-and-one-half room shape, A3 plan in the “Plan Selection and Orientation” diagram (fig. 2.19). The plan followed what the firm specified in their previous research, in which two bedrooms were directly connected to each other and the bathroom and kitchen were adjoined to facilitate plumbing installation. The house was composed of a living room with a dining alcove, two bedrooms, a kitchen, and a bathroom. It had three curtained closets and two storage spaces and demonstrated careful consideration in minimizing both traffic congestion and sound transmission. Other significant design elements included two large windows covered with metal Venetian blinds in the living-dining area, a covered porch, a linen closet, a coat closet, a shower fixture over a tile-trimmed bathtub, built-in shelves and cabinets in the kitchen (fig. 2.20) (fig. 2.21).[23] The house was equipped with electric appliances such as a refrigerator, a water heater, a stove, and an oven. These detailed considerations were contrived to attract working families, encouraging them to remain at

[22] “Houses for Defense,” 322.

[23] Ibid.

the plant in the middle of the war when supply of labor force was limited and most needed. The structural system of the Martin House was identical to that of the early Experimental House No.2 in that it employed a wood skeleton frame and curtain walls.

Cemesto was the main building material, encompassing exterior and interior wall finish. It consisted of a cane fiber insulation board core, sealed with a special compound, between two layers of weather, fire and wear-resistant combinations of asbestos and cement.[24] Exterior walls employed one and one-half inch thick Cemesto board, and interior partitions were one inch in thickness. All of the boards and structural members were delivered cut to specified sizes by the manufacturer. Assembly work was executed mainly in a field shop on the construction site; a second field shop was set up for the assembly of plumbing, which was under a separate contract (fig. 2.22) (fig. 2.23) (fig. 2.24). Most importantly, the Martin House was "pre-engineered for mass production with the wall and roof materials factory-made and delivered to the building site."[25]

When this new prefabricated construction procedure replaced traditional craftsmanship, it also changed the traditional concept of housing design. The house became a product. The Pierce Foundation and SOM had aspired to erect 600 identical

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[24] *A Vital Contribution*, 10.

[25] Ibid, 7.

houses with identical drawings when they began their research. Every house in the two housing complexes was identical except for the colors of roofs, window frames, and curtains. While the houses were the same at the time of construction, they could be easily modified to produce many variations. The differences were purely cosmetic. The fundamental idea was maximum speed, construction and standardization from start to finish. In order to save time, construction was reorganized into specialized groups, each one concentrating solely on their designated task without any idea of how the whole house was completed. The construction workers of each team were like assembly-line factory workers, entirely alienated and isolated from the final product.[26]

The Manhattan Project and Oak Ridge

The development of the atomic bomb in the United States began around 1939, when Professor Albert Einstein of the Institute for Advanced Study in Princeton, New Jersey (along with others) urged President Roosevelt to initiate a nuclear research program. This effort enabled the U.S. Army Corps of Engineers to create the Manhattan Engineer District (MED) under the directorship of Brigadier General (later Major General) Leslie

[26] "Six Houses a Day," *Business Week*, September 13, 1941: 65. The magazine reports, "This Lebanon house is the spiritual father of homes for airplane workers which are going up at the rate of six a day at the Glenn L. Martin Co. Plant, Middle River, Md."

R. Groves (fig. 2.25). There were three major locations for the project: Oak Ridge, Tennessee; Hanford, Washington; and Los Alamos, New Mexico. The community in Los Alamos was directly operated by the military and was the smallest and least complex of the three. The Oak Ridge and Hanford communities were created as unprecedented military-civilian communes, more complex in their organization and operation than Los Alamos. Oak Ridge, designed and built by SOM, was constructed first and became a model for Hanford.

The site of the future Oak Ridge community showed few traces of human settlement until the end of 1942. That fall MED bought a rectangular area of 59,000 acres a few miles away from Norris Dam and eighteen miles west of Knoxville, Tennessee (fig. 2.26). The location had been carefully selected and was then fenced in its entirety to keep out intruders and spies. The remoteness made it safe from air attack. Natural barriers separated the principal buildings from a small but sufficient town. The Tennessee Valley Authority (TVA) provided dependable electric power in large quantities. The nearby Clinch River provided an adequate water supply. In addition, the land was cheap. The vast site which cost $2,600,000 (about $40/acre) was purchased through eminent domain.

MED ominously called the site ‘Kingston Demolition Range’ and later ambiguously renamed it Clinton Engineer Works (CEW). This was the name officially used to refer to the whole site during the project.[27] The town site was located at the eastern end of the reservation on the slopes of Black Oak Ridge. In order to avoid unnecessary confusion and to lessen outsiders' curiosity, the name of Oak Ridge was employed for the post office address of CEW starting from the summer of 1943.[28]

By the spring of 1942, several methods of extracting the rare isotope U-235 from the more common U-238 were tested and nearly ready for pilot plant construction. These methods were the centrifuge, gaseous diffusion, thermal diffusion, and electromagnetic methods of separating U-235.[29] The Tennessee Eastman plant at CEW, known as Y-12 and consisting of 270 buildings, employed the electromagnetic process. The Carbide and Carbon Corporation plant, K-25 which occupied 71 buildings, used gaseous diffusion. S-50, operated by the Fercleve Corporation, employed the thermal diffusion method (fig. 2.27) (fig. 2.28). These nuclear facilities were located in valleys eight to ten miles away toward the fenced western perimeter of the reservation. Also located in a parallel valley was the X-10 plant operated by DuPont, which produced a

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[27] Charles O. Jackson and Charles W. Johnson, "The Urbane Frontier: The Army and the Community of Oak Ridge, Tennessee, 1942-1947," *Military Affairs* (February 1977): 9.

[28] Leslie R. Groves, *Now It Can Be Told: the Story of the Manhattan Project* (New York; Harper, 1962), 25-26.

[29] "Construction for Atomic Bomb Production Facilities," *Engineering News-Record* (December 1945): 113.

small amount of plutonium. However, this was only a plutonium research facility, with the main production plant located at the Hanford Engineering Works in Washington.[30]

Later called the "Home of the Atomic Bomb," Oak Ridge arose suddenly from the sparsely populated, rugged and hilly landscape. Ernest A. Wende who worked as an engineer at Oak Ridge called the construction of the town "incidental by-product of the largest and one of the most effective projects for war."[31] The town and housing development were secondary in comparison with the construction of the nuclear facilities. Nevertheless, providing scientists, engineers, and operators of the nuclear facilities with the proper living environment was essential.[32] In addition, there was an agreement within the army that civilians (scientists, engineers, and other operators) should be provided with given better living conditions than military personnel.

No one initially anticipated the final size of the town. The city grew larger and larger until it became "the biggest job of quick town building ever attempted in the U.S.A."[33] In 1942, the land was empty and undeveloped. Just three years later, at the end of the war, there was a population of 75,000 people, 10,000 family dwelling units, 13,000

[30] Louis Falstein, "Oak Ridge: Secret City," *The New Republic*, November 12, 1945: 636.

[31] Ernest A. Wende, "Building a City from Scratch," *Engineering News-Record* (December 1945):149.

[32] Daniel Lang, "The Atomic City," *The New Yorker*, September 29, 1945: 52.

[33] "Atom City," *Architectural Forum* (October 1945): 103.

dormitory spaces, 5,000 trailers, more than 16,000 hutment and barrack accommodations, and all of the supplementary facilities for everyday town living (fig. 2.29).

SOM was in charge of the majority of the building projects at Oak Ridge. The main considerations in planning and building the town were "speed, saving of critical materials and minimum interference with the local labor supply."[34] It is not surprising that speed was the foremost consideration in many of MED's missions. To MED leaders, the key to winning the war was quickly operating nuclear facilities and producing the atomic bomb. Prior to joining this operation, SOM was only a small design firm with little experience apart from exhibition halls, stores and prefabricated houses. The firm only had about twelve employees in each of their Chicago and New York offices in 1942. How could such a small firm possibly take on one of the most confidential and largest projects of the war and complete its task so successfully? What were the effects of this success to the development of the firm? The answers to both of these questions involve SOM's reorganization from a small design firm into a competent and efficient large-scale architecture-engineering firm. Activities at Oak Ridge reveal how and why SOM succeeded in its mission and prepared the firm for its international triumph during the post-war period.

[34] Ernest A. Wende, "Building a City from Scratch," 149

As a small, virtually unknown firm, SOM was not the military's first choice for the job. In late June of 1942, the Stone & Webster Corporation (S&W) of Boston, one of the primary contractors for the Manhattan Project, agreed to take the responsibility for developing the reservation site including utility facilities and housing construction. For the next several months, however, District Engineer Colonel James C. Marshall and his staff gradually became aware of the corporation's inability to prepare town and housing development plans. There were also occasional delays in plan delivery which made MED apprehensive.

When S&W submitted its overall plan to the MED New York headquarters on October 26, 1942, General Groves, Colonel Marshall, Lt. Col. Nichols and others convened to review the proposals. The plans revealed many elementary mistakes including miscalculations in the number of urinals and showers.[35] In addition, during a telephone communication on December 17, 1942 with August C. Klein, then vice president of the corporation, the colonel expressed dissatisfaction with the design of the houses, describing them as "overdesigned" and "too fancy." Colonel Marshall firmly

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[35] General Groves mentioned that "Too many urinals and showers; not enough toilets. Ratio of 1:12 about right; change. Cut one row showers, add 4 toilets, eliminate 4 urinals. 24 wash bowls too many, to be reduced." "Notes on conference in District Office, 9:45 a.m., 26 October 1942," File MD-337, "Meetings and Conferences, District Office," Box 28, RG 4nn-326-85005, National Archives and Records Administration, Southeast Region Depository, East Point, Georgia (hereafter, NARA).

believed that S&W's designs for houses should not be accepted.[36]

In the meantime, MED began to evaluate S&W's plans internally. This task was carried out by the Principal Engineer of MED, Wilbur Kelly, and resulted in a brief report on January 3, 1943. The report stated that the drawings by S&W did not show any "originality or modern innovations." In addition, there was a much more serious problem. According to Kelly, S&W's work also contained major errors in estimating the cost. Out of the six types of the original houses, only one type was matched with the original cost estimate. The rest showed wide gaps between the original estimate and the new estimates. Some of the new estimates were beyond the limit established by law.[37] Kelly argued that the housing development "was not a sideline and should not be treated as such" and contemptuously reported that "plans equal to, or better than, the ones produced up to now could have been obtained from any lumber yard at the cost of printing."[38] He suggested two options to resolve the situation. The first was to force a reorganization of the S&W housing team with competent personnel and to re-assign the job to them; the second was

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[36] Transcript of Conversation between Klein and Marshall, 5:40 p.m., December 17, 1942, File MD-600.1, "Construction and Installations," Box 41, RG 4nn-326-85005, NARA.

[37] Wilbur E. Kelly, "Report on Housing Plans – Summary of Status and Recommendations," January 3, 1943, File MD-624 "Housing," Box 52, RG 4nn-326-85005, NARA. "It is not desirable to build houses of the types design by Stone and Webster at the costs indicated, and of course, the law prohibits construction of any single dwellings costing over $7500.00."

[38] Ibid.

to establish a new contract "for house design to an architectural firm experienced in low cost work." Kelly clearly preferred the second, as he and his colleagues had encountered more than enough troubles. He finally insisted that a new architecture firm be hired and S&W be released from the town and housing design mission.[39]

MED began searching for a reliable architecture firm on which they could trust. They immediately turned to the Pierce Foundation, which was well-known for its low-cost prefabricated housing research from the late 1930s. William Brown, a partner at SOM, later recalled that Joseph O'Brien of the Pierce Foundation knew of the project and phoned to set up a meeting with MED.[40] However, it is more reasonable to believe that O'Brien was contacted by MED first.[41] Considering that MED was searching for an architectural firm that had experience in the development of low-cost housing, the team of the Pierce Foundation and SOM made sense: a competent housing research foundation and its consulting architecture firm. Due to the success of the houses they had constructed for Glenn L. Martin, mass producible, easily transportable, and inexpensive Cemesto-clad

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[39] Ibid.

[40] William S. Brown, Manuscript sent to Owings, October 1970, Box 49, The Papers of Nathaniel A. Owings, Library of Congress.

[41] Nathaniel Owings recalled the first meeting with MED: "One fine December afternoon in 1942 two men in civilian clothes walked into our New York office unannounced and requested an interview with Louis Skidmore." Nathaniel A. Owings, *The Spaces in Between: An Architect's Journey* (Boston: Houghton Mifflin Co., 1973), 83.

units, the team seemed almost ideal to the military.

On January 28, 1943 about three weeks after the submission of the negative evaluation of S&W, a small meeting was held in New York City. Four people attended: Captain Block and Lieutenant Moore of MED, Joseph F. O'Brien of Pierce Foundation, and Louis Skidmore of SOM. The MED officers had organized the meeting in order to learn more about the team and, in particular, its experience in town planning and housing development. O'Brien and Skidmore promised they needed only two weeks to present "complete plans and specifications, a site layout including stores, dormitories, recreational facilities, hospital, etc., and cost estimates based on any size town."[42] O'Brien persuaded the officers to consider their plans as a viable – indeed preferable – alternative to those submitted by S&W. However, the MED officers thought that it would be worth doing some more research on the foundation, including visiting completed projects by the foundation and the firm. They accepted O'Brien's and Skidmore's offer, noting that for the preliminary work the foundation and SOM would not claim any expense.[43] Skidmore and Merrill departed for Baltimore along with several army officials to tour the Glenn L. Martin housing project.

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[42] "Conference with J. B. Pierce Foundation with Reference to Town Planning and Housing Development," January 29, 1943, File MD-337, J.B. Pierce Foundation, Box 29, RG 4nn-326-85005, NARA.

[43] Ibid.

MED soon discovered that the foundation was one of the leading research institutions in the field of low-cost prefabricated houses and that the architecture firm had sufficient if only small-scale working experience. It was clear to those involved, however, that the military considered the team primarily because of the foundation's reputation.[44] For the first year or so, SOM was not recognized separately from the Pierce Foundation. Partially for this reason, the firm desperately tried to get more exposure to MED to secure the commission, establishing strong relationships with the officers and competently handling all their assignments. However, the design of an entirely new city with a network of houses, schools, hospitals, shopping centers and streets was all the more daunting because of the extreme secrecy surrounding the project. When the architects asked the officers about the location of the town, they were told it was confidential. The only information that the designers could obtain amounted to a few aerial photographs and topographical maps without titles or names.[45] After spending several days collecting this basic yet vague information, the SOM planners spent four to five days finishing the town planning. The design was then ready to be submitted to MED.

A meeting took place on February 16, 1943, in the MED office in New York

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[44] Nathaniel A. Owings, *The Spaces in Between: An Architect's Journey*, 86.

[45] Stéphane Groueff, *Manhattan Project: The Untold Story of the Making of the Atomic Bomb* (Boston: Little, Brown and Company, 1967), 163.

City. S&W's housing and site plans were placed on the table alongside another set of drawings by SOM. Leon H. Zach, a Harvard-trained landscape architect, former associate with Olmsted Brothers and chief of the Engineering Branch, Construction Division of the US Army Corps of Engineers, was called in and asked to compare the two plans. Zach criticized S&W harshly for the poor quality of their general scheme, specifically the lack of traffic circulation, narrowness of city blocks, minimal consideration of topography and parking, and poor drainage. On the other hand, he applauded SOM. According to Zach, SOM's plans showed "far more thought and ability." He chose to proceed according to the new SOM plans. The meeting resulted in five instructions given to the Pierce Foundation (and SOM) which would redirect all of the housing and town developments in Oak Ridge.[46] After this meeting, the Pierce Foundation and SOM immediately and officially became part of the Manhattan Project. Their first assignment consisted of the design of one thousand houses, subsequently increasing to three thousand, five thousand and eventually, ten thousand houses within a year. Even with this time constraint, this

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[46] "Conference – Housing," February 17, 1943, File MD-337, "Meetings and Conferences, District Office," Box 28, RG 4nn-326-85005, NARA. "A. Pierce Foundation to go ahead as quickly as possible on 1000 house layout, including shopping and recreation facilities for same, using survey parties and draftsmen in field with a view to starting road construction Monday, February 22. B. Pierce Foundation to proceed with plans and specifications of houses in order to have them ready for bidding in approximately two weeks' time. C. Pierce Foundation to furnish detailed street layout as soon as possible in order to arrange conference with Stone and Webster relative to utilities, as Stone and Webster will do this work. D. Pierce Foundation to work up and submit a schedule for construction of 1000 houses by July 1 with recommendations on number of contractors necessary, etc. E. Pierce Foundation to furnish plans for a women's apartment dormitory."

was the beginning of an ideal commission: designing an entire town from scratch.

MED called a meeting a week later to streamline the transfer of work on February 24, 1943. The military officials asked SOM to "provide detailed layout of sections of the town site as rapidly as final locations have been checked and established on the ground," even though the design of the drainage system was officially S&W's. In addition, SOM was required to submit recommended road sections for approval "within the next day or two" and to make recommendations for locations of a temporary trailer camp to house 1,000 trailers.[47] This transfer of work happened immediately. A letter from Lt. Colonel K. D. Nichols sent to S&W made it clear that they were relieved from the responsibility of overall town planning, preparation of plans and specifications for dwellings, shopping center, schools, theater, church, recreational facilities, and the town hall. All of those responsibilities were now in the hands of SOM, which had little experience with those programs. Nevertheless, Nichols made it clear that certain work being done by S&W would remain with the corporation, writing that "the elimination of the work by this letter does not alter your responsibilities for design and construction of the now-authorized dormitories, cafeteria, laundry and guest house."[48] The letter also

[47] "Memorandum to the Files," February 25, 1943, File MD-337, "Meetings and Conferences, District Office," Box 28, RG 4nn-326-85005, NARA.

[48] A letter by Lt. Colonel K. D. Nichols to R. T. Branch of S&W, February 17, 1943, File MD-600.1,

revealed that plans for the hospital were being reviewed. Prior to this point, S&W still thought that they held the hospital design commission as well as the dormitories, cafeteria, laundry and guest house facilities.

From March 15 on, an entirely different story developed. Lt. Colonel Robert C. Blair sent a letter to S&W. Blair pointed out that Nichols's letter "did not contain any definite statement as to whether you [S&W] would retain responsibility for design of the hospital." The design of the hospital (with all other jobs mentioned above) would also "be assigned to the Pierce Foundation."[49] This transfer was just one of many such instances. SOM and O'Brien tried, officially and unofficially, to supplant S&W. O'Brien, for example, sent an informal letter to Captain Block on March 3, 1943 about the apartment and guesthouse at the town site after studying the S&W plans with the SOM architects. O'Brien found technical mistakes in the S&W drawings and returned those plans with corrections arguing that they were "not intended to be a criticism of the plans drawn up," but intended to call Captain Block's attention to "certain things that seem to be somewhat out of proportion."[50] Shortly thereafter, the design and construction of the dormitories

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"Construction and Installations," Box 41, RG 4nn-326-85005, NARA.

[49] A letter by Colonel Robert C. Blair to R. T. Branch of S&W, March 15, 1943, File MD-600.1, "Construction and Installations," Box 41, RG 4nn-326-85005, NARA.

[50] A letter by J. F. O'Brien of the J.B. Pierce Foundation to Captain Block, March 3, 1943, File MD-624 "Housing," Box 52, RG 4nn-326-85005, NARA.

and the guest house were also turned over to SOM.

Skidmore later took advantage of personal relations with MED officers. The design and construction of some facilities in the Chicago area is a good example. Captain Joseph T. Ware had close personal and professional relations with the SOM partners, having worked as one of the liaison officers between the firm and MED in 1943. He stayed at the SOM New York office many times and travelled to the MED office located several blocks away. On the 5th of September, 1944, Captain Ware sent a letter to the MED headquarters about the modification of a commercial building in the Chicago area. Here too he insisted that the job not be given to S&W, arguing that "investigation by the contractor revealed that the firm of Skidmore, Owings and Merrill, with offices in Chicago and New York, was in a position to begin design work immediately."[51] Apparently, Captain Ware knew SOM's situation well and favored the firm. After working only about a year and half, the small design firm had become quite competitive and seemed entirely trustworthy to the military. The MED personnel who worked closely with the firm now recommended SOM over larger organizations.

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[51] "Chicago Area – Construction Contracts," September 5, 1944, File MD-600.1, "Construction and Installations," Box 41, RG 4nn-326-85005, NARA. Joseph T. Ware, who was stationed in the SOM New York office in early 1943 before being transferred to the MED Chicago Office, wrote the report.

‘Technologically Modern’

MED officials approved the general town and housing plan in the hectic February of 1943. SOM inquired about when they should send a team out to the site to begin work. The answer was “immediately.” Merrill along with five other SOM architects and planners including Albert Goers, Louis Scesa, and Walter Metschke took off for the site. This was about a week after the final meeting on the planning of the town among S&W, SOM, MED and Leon H. Zach. The travel arrangements were rather unusual. They were informed by a MED officer to be at Pennsylvania Station of New York City at a precise time, without any indication as to their destination. The architects and planners received their tickets in sealed envelopes. After boarding the specified train, the crew opened the envelopes and discovered that their destination was Knoxville, Tennessee. The day after arriving in the city, they met Colonel Nichols for the necessary instructions and moved to the CEW. On the site, Merrill set up a temporary field office in the rear of a garage and started surveying the area.[52] The SOM crew inspected all of the road locations on foot in order to avoid topographical obstacles. They also surveyed all potential locations for houses.

The site plan initially selected and approved by MED was based on a contour

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[52] Groueff, *Manhattan Project*, 164-65.

map and some aerial photographs. The architects believed that the site plan would only be used for preliminary planning purposes and not for construction. MED, however, thought otherwise. There was no time to develop a new site plan derived from the context. SOM thus had to adopt a strategy for supplementing the submitted plan with thorough exploration of the whole site, rather than preparing another site plan based on the actual context. This procedure was enacted because re-planning would require too much time. Walter Metschke, who took on a critical role in developing the original plan as a site planner and later civil engineer, remembers the process as follows:

> The first move was to randomly stake an alignment which the survey party would accurately locate in the field as a basis for preparing a computed vertical and horizontal alignment. This stationed alignment was then staked in the field. It was again walked for required adjustments. The roads were located on top of the ridges and in many situations had to be precisely on the center line of the ridge to accommodate housing on both sides… Each time the road was restaked in the field it was again walked for possible revisions, a new alignment prepared, computed and restaked. This procedure was repeated as many times as necessary to achieve as nearly perfect an alignment as possible to avoid construction errors and delays.[53]

This repetitive operation in the field was required to avoid any delay since there was no

[53] Walter G. Metschke, *Memoir of Walter G. Metschke* (The Art Institute of Chicago, 1998), 38-39.

time to correct errors or make changes. Once the position of the roads was indicated, the rest of the procedures were almost automatic. As the SOM team scrambled along the hilly landscape, staking out roads, sewers and water lines, the construction crew followed right behind them (fig. 2.30) (fig. 2. 31) (fig. 2.32).[54]

The road and housing construction set the pace for the whole project at Oak Ridge.[55] The military's minimum requirement was site plans for fifty houses each day.[56] Every lot was staked in the field and plans for the four corners of the house were applied. Furthermore, the center line of the road was established so that the finished floor plans could be applied by field inspection. Trees were cut down only when they were located within the boundary of a house. To save time, new construction methods were systematically and enthusiastically devised. As in the Glenn L. Martin project, the construction process was divided into separate operations, each of which was processed one by one. However, the operation at Oak Ridge was better organized and much faster (fig. 2.33) (fig. 2.34). Each process, such as pouring a foundation or erecting walls, was performed on a number of houses at the same time and when the first crew was ready to

[54] Owings, *The Spaces in Between*, 96-97.

[55] Groueff, *Manhattan Project*, 165.

[56] Walter G. Metschke, *Memoir of Walter G. Metschke*, 39.

move on, another crew took over according to the construction sequence clarified by the firm. By doing so, 30 to 40 houses were completed and ready for occupancy each day.[57] This expedited construction of prefabricated houses would later be continued and popularized by private industry mass-developers such as Levitt & Sons.

Oak Ridge was a narrow strip approximately one mile wide and over six miles in length, stretching along a major ridge (east-west axis) and crisscrossed by minor ones. This linear layout proved to be "adaptable to rapid expansion on the difficult, hilly site. Houses were placed to take advantage of the lovely view and existing trees, but to necessitate a minimum of roadway construction."[58] The general network of streets was determined by the topography of the landscape. This method was the best way to save time and construction costs and allowed for easy expansion. The gentle slope was the result of the army's requirement that the percentage of grade on the roads should not exceed eight percent (later, at SOM's request, the requirement was raised to twelve percent because of the topography of the site).[59] The street layout looked natural and the city appeared almost picturesque on the map, avoiding the typical grid pattern of modern

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[57] "Atom City," *Architectural Forum* (October 1945): 105.

[58] Ibid.

[59] Metschke, 38.

planning (fig. 2.35).

In order to avoid the confusion of disorderly names in a street system, a systemized nomenclature was contrived by SOM. Several thoroughfares connected the ridge with the valley. There were three principal east-west main roads called "Avenues;" the connecting roadways were called "Roads;" loops that led to the original place were called "Circles;" dead end streets were identified as "Lanes" or "Places." The avenues were named after states and all streets leading to one avenue employed the same first letter. For example, all streets leading from Kentucky Avenue had names beginning with the letter "K," like Kelvin Lane, Kenwyn Road, Kimball Lane, and Kingsley Road. The alphabetical system was employed everywhere except for the three east-west arterials.[60] Consistent with SOM's work, even the street naming was simple and efficient.

The original experimental house of 1939 and its numerous variations became an important part in deciding the general image of Oak Ridge (fig. 2.36) (fig. 2.37) (fig. 2.38). All the houses were standardized, yet diverse in size. The A and B types were small two-bedroom houses, the C house had an extra bedroom, and the D house had a dining room. The A, B, and C types were ranch style while the D was L-shaped. All of the houses had picture windows in the living rooms, hardwood floors, and a blower air

[60] "How Oak Ridge Street Program Grew," *The American City* (April 1948): 102-03.

circulation system. Like the Glenn L. Martin house, all houses were equipped with stoves, refrigerators, garbage cans, and Venetian blinds or shades in all windows. They were heated by coal furnaces.[61]

For the city, houses, and facilities, MED gave SOM "no requirement of stylistic design."[62] However, there was an architectural principle of homogeneity in the design of the houses. They looked conventional at first glance, but to the more trained eye, they appeared as something in-between; a hybrid. There were three reasons for this; first, SOM employed the Experimental House developed by the firm and the Pierce Foundation as a generic template. Second, there was no time to develop new designs. Additionally, MED officials were comfortable with the original designs, in part because they preferred a pseudo-conventional aesthetic. This third point deserves further explanation. The initial 3,000 Cemesto houses were intended to accommodate well educated engineers, scientists, and their families. SOM was asked "to provide an environment which would offer no unavoidable conflict with their temperament, their routines and their habitual standards." It was assumed that residents would be from many different parts of the country, not just from big cities. Therefore, modern architecture

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[61] Martha Cardwell Sparrow, "The Oak Ridgers," (Master's Thesis, Mississippi State University, May 1980), 41-43.

[62] Joseph T. Ware, a letter sent to Owings, October 7, 1970, Box 49, The Papers of Nathaniel A. Owings, Library of Congress.

would not be widely popular. However, MED believed that the residents would want certain modern amenities inside their homes: electric kitchens and built-in heating systems as well as visible fireplaces and porches.[63] This effort to lessen the readjustment difficulties of the personnel undoubtedly contributed to the conventional image of the town.

It should be noted that the Experimental House No.2 and its variations were not developed for any specific context or climate. In principle, they could be built anywhere with minor modifications. As Colonel Nichols recalled, “Oak Ridge was a city without past, and it was not designed to have much of a future. We tried to design only for the duration of the war, in order to conserve money, materials, and labor.”[64] The short temporality of the town was a perfect condition for the Pierce houses, technologically modern but formally indefinable. The earliest houses could be called prefabricated designs with vague allusions to the country dwelling (fig. 2.39) (fig. 2.40). However, more advanced technical products soon replaced the envelopes whenever needed. All parts of the houses and other buildings were manufactured in factories, delivered by train, and assembled on site. Building parts were elaborately standardized with careful

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[63] Owings, *The Spaces in Between*, 90.

[64] K. D. Nichols, “My Work in Oak Ridge,” *These Are Our Voices: The Story of Oak Ridge, 1942-1970*, ed. James Overholt (Oak Ridge, Tennessee: Children’s Museum of Oak Ridge, 1987), 116.

consideration paid to systematized construction so that assembly was quick and easy.

The architectural historian Peter B. Hales praises SOM's entire Oak Ridge development for "its combination of conservation and innovation, its melding of the mythic qualities of past American utopias with the modern vision of centralization and government management."[65] The houses united conventional images and advanced mass production technology. The town and houses irresistibly recalled traditional villages; the organic shapes of the streets and traditional shapes of the houses are a testimony to the imagery of past America. The technology employed in their construction symbolized the other side; a mechanical and futuristic America. In this sense, Hales's comment captures the essence of Oak Ridge. At the same time, it should not be forgotten that the organic imagery was the result of army's time and cost requirements.

The crucial fact here is that SOM designs used anonymous nostalgic images to produce conventional yet mystical sentiments that contributed to the centralization and governmental management of CEW. There was no tension between the centralized, government's ownership and management of the town and a small-town, natural design aesthetic. The two were part of the well controlled whole. If there was a nostalgia for the American past at Oak Ridge, it was an outcome of the speedy construction of technology,

[65] Peter Bacon Hales, *Atomic Spaces: Living on the Manhattan Project* (Urbana, Chicago: University of Illinois Press, 1997), 85.

on one hand and the tight military control of the town on the other. This imagery actually belonged to the flexibility of modular technology. In other words, the design was neither modern nor traditional, but a hybrid, technological and transformative. The overall image of the town was derived from systematic mass reproduction. In some sense, asking whether the style of the houses was modern or conventional is irrelevant. They were all modern, technologically, while style was simply a matter of taste.

Becoming a Large Firm at Oak Ridge

With an increase in size and complexity of its participation at Oak Ridge, SOM was forced to reinvent its own architectural practice. The town itself went far beyond the boundary of a traditional architectural practice, requiring a new architecture-engineering firm that could cover road and housing construction, hospital and school design, town planning, equipment design and interior design. SOM's mission required the firm to extensively expand their business areas, diversify personnel, manage a large number of people with various backgrounds, and rationalize the firm's organization for efficiency and effectiveness. The town of Oak Ridge was a laboratory where SOM built a new kind of architectural practice that anticipated the fast approaching corporate architectural and engineering practice.

SOM's first contract officially spanned from February 1943 to July 1943. The main focus was "the design of all structures required for a community to house approximately 12,000 inhabitants," which included "the design of dwelling units, store groups, theatres, churches, grade schools, high school, hospital, recreation buildings and other buildings as required for the community." In the first phase, SOM designed site plans for roads and house locations: 3,000 dwelling units comprised of six types, two shopping centers, a town administration building, a hospital, a nursing home, an elementary school, two apartment buildings, a gas station, a recreation hall, and several neighborhood stores. SOM was hired with the lump sum of $130,000 under the condition of compensation for overtime and additional services.[66] The total amount would later prove to be millions of dollars, attracting more jobs in other MED-related areas both during and right after the Second World War.

None of the designers at SOM had any idea how many schools, supermarkets, hardware stores, and barbershops would be needed, not even for the population of the initial 12,000 inhabitants. With little experience in urban planning or large-scale projects, the designers made reasonable estimates, relying upon data in almanacs and the wisdom

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[66] "Design Progress Report: Skidmore, Owings & Merrill," June 15, 1943, File MD-600.914 "(Skidmore, Owings & Merrill) Design Progress Report," Box 4, RG 4nn-326-85005, NARA.

of experts.[67] They studied Lawrenceburg, Indiana, a similar size city that was Louis Skidmore's birthplace, and then developed a technique based on coefficients per person. For example, there were a certain number of barber chairs in Lawrenceburg. That number was divided by the number of men; so each man in the city theoretically needed 0.0012% of a barber chair. In the same way, each woman required 0.00658% of a beauty shop. By multiplying the expected community population by these numbers, SOM designers produced scientific estimates applicable to MED's changing population estimates.[68]

The second major contract spanned from September 6, 1943 to August 1, 1944. Now the scale of SOM's task grew much larger and more complex. The estimated population of this phase rose to 44,000 residents and soon increased to 66,000. Design specifications included overall site plans, 9,250 new family dwelling units excluding the 30,000 units already under construction, new men's dormitories necessary to accommodate 1,600 mean, women's dormitories to house 6,000 occupants, cafeterias, laundries, schools, and other structures to complete the development of the city (fig. 2.41) (fig. 2.42) (fig. 2.43) (fig. 2.44) (fig. 2.45) (fig. 2.46). It also incorporated distribution facilities in the town which had previously belonged to S&W. Now serving as an

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[67] Groueff, *Manhattan Project*, 164.

[68] Owings, *The Spaces in Between*, 87-91.

architecture-engineering firm, SOM was asked to handle facilities such as the various sewer, water, and power facilities.[69] In sum, they played an increasingly important role as the expansion of the plants created a need for more housing and the full range of services necessary for normal town living.

At the end of 1944, about twenty months after the first team of six SOM employees arrived, the firm had some 650 employees at the Oak Ridge site. The New York and Chicago offices had also grown significantly, supporting the operations at Oak Ridge and working on several military projects. SOM had been transformed into an entirely different firm in its organization, operation, and capability. In March 1943, while Merrill and others were working at the site from dawn to dusk seven days a week, the small New York office on East Fifty-Seventh Street was full of architects, engineers, and draftsmen producing plans for houses. William Brown, who was then only thirty-four years old, was put in charge of the housing project at Oak Ridge. He later took charge of the special buildings as well as the housing. Robert Cutler designed the hospital and Arne Engberg the Town Center. By this time, Merrill had set up an office in the Administration Building at Oak Ridge and worked primarily on site planning and building location.[70]

[69] A Letter by Captain Samuel S. Baxter to T. C. Williams, Project Manager of S&W at CEW, October 4, 1943, File MD-600.914 “(Skidmore, Owings & Merrill) Design Progress Report,” Box 4, RG 4nn-326-85005, NARA.

The SOM New York office was the locus for the Oak Ridge project until late 1943. Drawings were produced there and sent to the nearby MED headquarters. Due to security reasons, the communication between the firm's New York office and the Oak Ridge office was modulated by the military security team. Several MED officers, Colonel Blair, Captain Ed Block, and Lieutenant Ware were assigned to the mission and almost continuously stayed in the office. Their jobs entailed guiding and checking all drawings and acting as a liaison between SOM, MED, and CEW.

In August 1943, Colonel Marshall, Engineer of the District, was promoted to Brigadier General and assigned another job not related to the Manhattan Project. The deputy Engineer Kenneth Nichols became the leader of MED under General Groves. Realizing the strategic importance of CEW, he decided to transfer the district's headquarters from Manhattan to the administration building at Oak Ridge called "the Castle." Accordingly, the major part of the SOM design team moved to the city of Oak Ridge in the same month (fig. 2.47). The team found a number of difficulties at the new location including the acquisition of office space, telephones, and furniture.[71]

Nevertheless, the whole situation was significantly better for SOM. First of all,

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[70] Brown, Manuscript sent to Owings, October 1970, Box 49, The Papers of Nathaniel A. Owings, Library of Congress.

[71] Ibid.

the complicated communication problem between MED and the SOM New York and Oak Ridge teams had dissolved, so the firm could instantly respond to certain unexpected situations or difficulties occurring at the site. Secondly, SOM as architect-engineers became fully exposed to MED. The latter gradually relied on the firm for any issue related to town planning, housing design and construction. At the early stage, until the end of 1943, SOM was regarded as part of the Pierce Foundation. When the main design team of the firm along with other related crews in the New York office finally moved to the Oak Ridge site, its presence was instantly felt by MED. This meant, for the military, that SOM was immediately and continuously available for the diverse demands of the city. The firm was constantly pressed by MED to take on many different roles. This not only meant intense pressure, but a great opportunity as well. Working at the site of one of the most confidential projects in the Second World War, SOM now had to restructure all loosely related areas of architecture-engineering under the aegis of its firm. This was the true beginning of the modern, bureaucratic architectural firm.[72]

SOM took on an exclusive yet inclusive role within the fenced town of Oak Ridge. As the only architecture-engineering firm in the town, the scope of their

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[72] Henry-Russell Hitchcock describes SOM as an example of architecture of bureaucracy in the 1947 article, “The Architecture of Bureaucracy and the Architecture of Genius,” *Architectural Review* (January 1947): 3-6.

responsibility was indeed "challenging" as Owings later acknowledged, and MED gave them "many interesting roles to play." It was "alarmingly all-inclusive."[73] The firm was responsible for anything remotely connected with the planning, building, furnishing, or equipping of the town. This was quite beyond the conventional boundary of architectural services. The situation forced Skidmore and Owings to supplement more traditional architectural work from other professions, restructuring its organization by bringing in competent professionals from entirely different fields. For instance, the L. S. Ayers department store in Indianapolis dispatched their key merchandizing manager at Owings's personal request. In addition, Skidmore asked Robert Moses of New York to send the chief engineer of the Tri-borough New York-New Jersey Bridge Authority to head the traffic and highway department. SOM hired a complete construction company from Grand Rapids, Michigan to become the construction division of the firm. Construction manager Jan Porel, with whom SOM had worked on the Glenn L. Martin project near Baltimore, also joined the team.[74]

Importing personnel from other fields was to some degree compelled by SOM's second contract with MED. "The Architect-Engineer was required to maintain his

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[73] Nathaniel A. Owings, "From Oak Ridge to Manhattan and Way Stations," Lecture given to the Chicago Wayfarers Club, October 15, 1946, "Speeches & Writings, Box no.53, The Papers of Nathaniel A. Owings, Library of Congress.

[74] Owings, *The Spaces in Between*, 87-88.

complete staff, and conduct all his operations at Oak Ridge," wrote Captain Samuel Baxter, then the Contracting Officer's representative at MED. After working with SOM during all stages of the contract, he reported that "an adequate and competent organization was maintained throughout the period of the contract."[75] All those in charge of the various departments were "experienced and capable men in their respective fields." Baxter similarly indicated that the business administration of SOM was "well organized and functioned efficiently and that accounts, files and property records kept up to date and in good order with the result that final accounting and auditing of the contract should be completed in a minimum time after the completion of technical services."[76] Thus SOM's positive evaluation was, in part, the result of its having imported personnel from other fields and of managing them efficiently. Ironically, the strength of the architecture-engineering firm had less to do with quality of its design than its organizing ability.

Even the MED officials sometimes thought that SOM's schedule for completing housing, special buildings, roads and utilities was almost impossible or, at least, extremely difficult. To some extent, they were surprised by the fact that SOM produced all the requisite drawings and specifications within the allotted time-frame.

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[75] Captain Samuel S. Baxter, "Completion Report of Skidmore, Owings and Merrill, Contract No. W-7401-eng.69." October 9, 1944, File MD-600.914, "Skidmore, Owings & Merrill, Completion Report," Box 51, RG 4nn-326-85005, NARA.

[76] Ibid.

MED perceived SOM as quite an efficient and competent organization. Captain Baxter concluded the report about SOM:

> It is the opinion of the undersigned officer [Captain Samuel S. Baxter] that Skidmore, Owings and Merrill discharged work under this contract in a highly satisfactory and efficient manner, that competent men were placed in charge of the various parts of the work, that schedules were met in most instances, and that the work produced fulfilled the requirements of the District Engineer in an economical manner. The partners, the project manager, and the department heads of Skidmore, Owings and Merrill cooperated with the undersigned officer in every way possible, and left nothing undone in their efforts to complete the job in the best manner in the shortest time.[77]

The firm successfully completed the contract, while simultaneously restructuring its organization. A small architecture firm had transformed itself into a well-modulated architecture-engineering firm capable of undertaking a complicated engineering project. Working under a difficult schedule, SOM overcame all obstacles and became a large, complex, yet flexible organization. The various roles that SOM's architects were forced to take on at Oak Ridge helped them carry out far-reaching projects, which most architecture firms of that period could not have undertaken.

William Brown, one of the early partners of the firm, recalled that the Oak

[77] Ibid.

Ridge project significantly increased the scale of the firm's operations and the number of staff. Brown also noted that the personnel of the firm "successfully handled the problems involved in coordinating many different types of technicians toward a single result."[78] As he described it, the experience of the Oak Ridge project would later enable the firm to qualify for large-scale military and government projects. SOM designed and built the physical infrastructure that would support American military forces and corporate entities in the 1950s in foreign countries such as the Philippines, Venezuela, Okinawa, and Morocco. The firm built numerous corporate headquarters, hospitals, and laboratories in many parts of the country. In fact, one could argue that the small firm only became SOM after its experience in Oak Ridge. The size, boundary of business, and organizational structure of the firm changed fundamentally during the war. Simplified architectural design, advanced technology and efficient organization of a large-scale labor force were harmoniously unified. The firm would be known for a modern aesthetic that was inseparable from its systemization and mechanization of architectural design and its internal restructuring as a bureaucratic business organization.

SOM's presence at Oak Ridge continued well into the post-war period. From the late 1940s, the firm undertook a new mission of transforming the temporary military-

[78] Brown, Manuscript sent to Owings, 6.

civilian complex into a permanent city (fig. 2.48). Thereafter, SOM designed new buildings to replace the temporary, poor quality buildings previously erected or brought from other areas during the war. What was intriguing in these buildings was their design. Their forms were undoubtedly modern from almost any perspective (fig. 2.49). The June 1951 issue of *Progressive Architecture* included an advertisement of the Sloan Flush Values. It included four photos of SOM between 1946 and 1950. Two were school buildings, the other two were housings. Interestingly, all of the buildings did not show any traces of pervious conventional designs which were prevalent in Oak Ride. Instead, the schools boasted modern appearances such as flat roofs and sleek glass-steel surfaces. The descriptions emphasized modern design of the two schools, arguing that "Ultramodern educational facilities are available to Oak Ridge youth in this fine high school" and "Elementary schools are designed in contemporary manner." Oak Ridge was now a representation of modernism. The same ad described a housing building: "Attractive, multistoried apartments provide modern homes overlooking wooded hills."[79] This rhetoric of stylistic modernism appeared in a more official setting. A year before the ad, the MoMA exhibition catalogue praised modern forms of the same housing project: "The design of these buildings is uncompromising in its severity when compared with the

[79] Sloan Flush Valves Advertisement, *Progressive Architecture* 32 (June 1951): 62.

'cottagey' approach of most low story housing developments. Its attractiveness depends upon the felicity of fenestration and the purity of proportion."[80] However, it should be noted that the same firm and architects who had designed the "cottagey" or the conventional looking, pitched roof buildings during the war created these "ultramodern," "contemporary" buildings. There was no gradual transition in style from conventional to modern designs; they were identical in essence as though the modern form was already embedded in the production system as a ready-made.

With the detonation of the atomic bomb in Nagasaki and Hiroshima, SOM abruptly concluded this brief yet transformative journey, one that had begun with the small Experimental House in New Jersey. That first house turned out to be a seed for several thousand houses within about five years, and it generated many different types of buildings such as dormitories, hospitals, schools, shopping centers, and offices. The journey culminated in the formation of a formidable architectural organization that combined the technical standardization and systemization of buildings with the concept of flexible space.

To some extent, the massive architecture-engineering firm was also the structural incarnation of that small prefabricated house. With the introduction of the

[80] "Skidmore, Owings & Merrill," *Museum of Modern Art Bulletin* XVIII, No. 1 (Fall 1950): 5.

‘bureaucratically’ organized firm to the field of architecture, architects began to take on different roles from those of the traditional artist-architect. Building design now became a minor part of a firm’s operation and was reorganized to be a combination of all building-related considerations. Architects were encouraged to incorporate technological, political, economic, and cultural issues into their design process. As a group, the architects of SOM developed an efficient, flexible organizational machine which could produce systematic results under any circumstances. All of these developments were initiated at Oak Ridge where the immense pressure of speed allowed for little emphasis on design.

SOM’s initial prefabricated house was scientifically designed. It was built to be a prototype, exemplifying the standardization of building parts and the systemization of design and construction. Repeated over and over again, it evolved into different houses and facilities. This evolution would later culminate in the glass-steel modern corporate headquarters of post-war American architecture. The anonymous corporate buildings that proliferated throughout American urban and suburban areas after World War II were a natural evolution of war-time building technology. The modern European forms in SOM’s postwar buildings were to some extent coincidental. Thus, rather than trying to find formal similarities with European modernism, it is more appropriate to ask how post-war American architecture grew out of its autochthonous historical and technological developments.

CHAPTER 3

Flexibility and Abstraction: The Architecture of SOM in the 1950s

> *The war years had a profound impact on the growth of SOM because of the responsibilities that had been suddenly thrust upon those of us who served in the armed forces. Accepting these responsibilities, I am sure, greatly affected that cadre of veterans who returned to the firm after the war had been won. Each of us had had that magic moment when his judgment and action had affected the outcome of an important, or perhaps even vital, piece of the mosaic of war operations. We were no longer the starry-eyed young designers who wanted to rebuild the world in the Corb/Mies mold. We did still seek that brave new world, but our enthusiasm was now tempered by the pragmatism born of an extraordinary, immediate need. The Depression was finally over: We no longer had time to philosophize. We only had time to get the job done…The new era had indeed begun.*
>
> — Ambrose Richardson, "Skidmore and Owings: The Early Days," 1983

While rapidly advancing as an architecture-engineering firm during the Second World War, SOM laid the foundation for its rise as one of the leaders of modern architecture soon after the war. To meet the challenges at Oak Ridge from 1942 to 1945, the firm had developed a team-oriented design process and advanced its expertise in prefabricated technology. These were the basis of SOM's architectural achievements from the 1950s on.

Through the transformation of crude technological items of fast-track military operations into aesthetic objects, the firm established itself as one of the legitimate heirs of modern architecture.

In the 1950s, SOM pioneered a new trend for office buildings with glass and metal curtain walls, many of which soon became icons of post-war American architecture. The prismatic boxes with highly detailed designs were mainly the result of collective efforts. The firm became known to architectural communities around the world for their technical excellence combined with efficient organization of interior and exterior spaces.

This chapter deals with SOM's buildings designed during the 1950s, concentrating on their technical excellence and design ingenuity. Three representative buildings are closely examined: Lever House (1950-52), Manufacturers' Trust Bank (1954), and the Air Force Academy (1956-62). The three buildings each have distinctive programs: a corporate headquarters, a bank and a military institution. Each program evokes different socio-political issues such as the rise of corporations, the financial industry and the military-industrial complex. While all three buildings formally employed glass and metal curtain walls, they each represent three different types: vertical, urban infill and horizontal. While the buildings have distinct similarities, they also differ greatly in program and layout. The buildings' similarities and distinctions help clarify a new stage of the firm's production, one characterized by a combination of flexibility and abstraction.

The Institutional, the Dramatic, and the Utility

In 1944, Nathaniel A. Owings presented a paper at the Illuminating Engineering Society Technical Conference in Chicago. "Comments on Lighting Layout and Design" recalls the firm's earlier fascination with interior design for product display, indicating a new design direction in the following decades. In essence, the paper asks how one designs effective lighting for a commercial space. The first sentence could have been written by an industrial designer. "The purpose of lighting in *all stores* [emphasis in original] is to help sell merchandise."[1] Owings then classified three general ways of lighting: institutional, dramatic and utility. The first was used to establish an identity of chain stores; the second was used to structure a theatrical or to create a certain mood, and the third was employed to meet practical requirements. According to Owings, all three could be experienced in sequence. "First lighting can be a major aid in bringing the customer to the store; then second, within the store can excite the customer and help create an appetite for a specific type of merchandise – and thirdly, can provide her with the facilities to

[1] Nathaniel A. Owings, "Comments on Lighting Layout and Design," *Illuminating Engineering* XXXIX, No.10 (December 1944): 865.

inspect the product intimately."[2] "The institutional" was related to the identity of the store as a whole, "the dramatic" to various expressive effects intended to create certain emotions, and "utility" to the practical use of lighting in the store.

Owings also emphasized the importance of flexibility in equipment. He wrote, "the store is a *theatre* [emphasis in original] – the aisles being roughly analogous to the seats, and the selling areas representing the area where the drama takes place – the *stage* [emphasis in original]."[3] Theater productions constantly change. The theatre building should therefore be as flexible as possible to accommodate the various demands of drama performances. It is thus no surprise that the author greatly emphasized the store's flexibility. He contended that "maximum flexibility is fundamental and one of the prime answers to the problem [lighting]."[4] A good store should be able to accommodate many different exhibition layouts for various products. Owings also emphasized the significance of "ample and varied equipment – permitting infinite variety of effects – effects producible with the minimum amount of maintenance labor."[5] The combination of sufficient equipment with careful considerations of flexibility would result in

[2] Ibid.

[3] Ibid.

[4] Ibid.

[5] Ibid.

achieving great architectural effects.

> In a store provided with such equipment, installed with an eye to maximum flexibility, there is no reason why the techniques of the theatre could not be brought into use as a major aid in selling merchandise. Large scale effects can be obtained, vistas created, whole ends of floors becoming in themselves one dramatic lighting unit or area.[6]

Dramatic visual effects were effectively produced through the aid of equipment and flexible spatial organization.[7]

While these concepts were originally introduced to theorize lighting in a store, it is possible to consider their effect in buildings, especially office buildings by SOM in the post-Second World War period. “The institutional” can be understood as a way of creating a corporate image or an identity with the use of certain materials or forms. The building thus serves as a corporate icon or symbol. “The dramatic” encompasses various aesthetic considerations in design that are contrived to create certain emotions. A certain space or part of a building is designed with a specific design intention that aims at creating a particular feeling or emotion within people. “Utility” encompasses efficient

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[6] Ibid, 865-66.

[7] This part should be interpreted in conjunction with the article “Flexible Space” by Skidmore, Owings & Merrill included in “The New House of 194X,” *Architectural Forum* (September 1942): 100-03. See Chapter 2 for more details.

and systematic application of problem-solving processes for circulation, program clarification, and spatial organization.

In the 1950s, SOM was recognized for producing buildings that granted their clients architectural spectacles, formal and spatial embodiments of their businesses. While highly practical, SOM elicited great excitement for the general public, new corporate leaders and architectural communities alike. Several buildings became institutional icons for their clients. Most notably, Lever House (1952), Connecticut General Insurance Company (1957), Inland Steel Building (1958), Union Carbide Corporation (1960), and Chase Manhattan Headquarters (1961) (fig. 3.1) (fig. 3.2) (fig. 3.3) (fig. 3.4.) SOM represented the client with visual signs, intertwining the institutional with dramatic and utility.

SOM's buildings of the 1950s were based on modules that would be employed throughout the entire building.[8] Sufficient equipment was a precondition of maximum flexibility. Thus, the unique spatial quality of a typical large, open office space was made possible through the help of the versatile structural and organizational systems. Attempting to achieve maximum flexibility, all the mechanical and environmental

[8] Konrad Wachsmann defined a module as follows: "The module is the abstract fundamental unit of measurement." In this dissertation, a module means the minimum unit of measurement intended to facilitate mass production of it. Konrad Wachsmann, *The Turning Point of Building*. trans. Thomas E. Burton (New York: Reinhold, 1961), 54.

equipment was meticulously prepared and installed. In order to accommodate the various programs and activities in a single building, a versatile system of glass and steel curtain walls, based on the module, was employed.

The Curtain Wall as a Mechanism of Flexibility

The previous chapter argued that war-time collaboration with the John B. Pierce Foundation helped SOM specialize in prefabrication technology and, later, the glass and metal curtain wall. Owings's theories about sufficient equipment and maximum flexibility would not have been imaginable without the Pierce Foundation, in particular without his interactions with Robert L. Davison who served as the director of the Housing Research division of the foundation from 1931 to 1944.[9] Davison conducted important research on prefabrication technology as well as behavioral and other medical research related to domestic environments.

Davison also played a critical role in the development of the curtain wall.[10] He first introduced the idea of curtain wall for mass production in the late 1920s while

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[9] For more details about Davison and the John B. Pierce Foundation, see Chapter 2 of this dissertation. For historical importance of Davison and his research, refer to Hyungmin Pai, *The Portfolio and the Diagram: Architecture, Discourse, and Modernity in America* (Cambridge, MA and London: MIT Press, 2002), 151-58.

[10] For example, William Dudley Hunt, Jr., *The Contemporary Curtain Wall: Its Design, Fabrication, and Erection* (New York: F. W. Dodge Corporation, 1958). The author begins the preface with Davison.

serving as one of the editors for *Architectural Record*. At the time, the journal promoted both European modernism and native technological developments. The editorial staff had two ideological camps. Davison was among the scientific-technocratic group, and Henry-Russell Hitchcock represented the formalist group.[11] Soon after, in 1929, Davison made a research trip to Europe after which he published an important article, "New Construction Methods," stating why modern architects were looking for new machine-made materials that would provide an alternative to traditional masonry. "It is the opinion of some of the leading architects of Europe and America that it is entirely practical to eliminate masonry by using metal mullions as in the building by Cass Gilbert or in the Bauhaus," Davison wrote.[12] As an ardent supporter of new technology and its potentials in architecture, Davison summed up his ideas on modern architecture, materials and technology:

> The modern architect is aware of changed conditions which demand economy and truthful expression in present-day buildings. The spirit of the age, which is clearly dominated by the machine and mass production, makes necessary the adoption of machine-made

[11] Mardges Bacon, *Le Corbusier in America: Travels in the Land of the Timid* (Cambridge, MA and London: MIT Press, 2001), 18-19. Davison was Director of Research at the *Architectural Record* from 1929 to 1930 according to the biographical information included in Robert L. Davison, "Technological Potentials in Home Construction," *Law and Contemporary Problems* 12, No.1 Housing (Winter 1947): 16-24.

[12] Robert L. Davison, "New Construction Methods," *Architectural Record* (October 1929): 377.

> products, considered in the light of their aesthetic effects, steel, copper, aluminum and alloys, terra cotta, tile concrete as light as wood and having the virtues of fireproofness, sound and heat insulation, glass with health-giving qualities – all are added to the architect's palette. These products of the machine are to be used more and more frankly, first for their inherent structural and economic qualities and secondly for their aesthetic attributes.[13]

Like Skidmore and Owings, Davison was more interested in technological innovations than stylistic ones. Since mass-produced building materials were "the spirit of the age," he recommended them for their structural and economical qualities as well as for their aesthetics. He was mainly concerned with modern technological advancement, and spent little time on stylistic representations of these advances. Skidmore and Owings did not divert from Davison's way of thought. SOM's office buildings in the 1950s were the foremost result of technological application with artistic concerns considered secondarily. Before discussing the firm's post-war work specifically, it is helpful to discuss how Davison's philosophy advanced from the prewar to the postwar periods.

Working with Davison at the John B. Pierce Foundation, John H. Callender had the opportunity to take up Davison's idea and advance a rational architectural approach, focusing on prefabrication and human behavior in the domestic environment. In "The

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[13] Ibid, 384.

Scientific Approach to Design," Callender expressed his hope for "the application of scientific principle to dwelling design." This research proceeded from a study of 131 families in the New York area. The research mainly limited its focus to "sleeping, dressing, washing, and bodily elimination." Volumetric measurements of human motions, such as the size of the volume created when a person changes his or her clothes or washes hair, continued the study. Afterwards, the Foundation conducted physiological and psychological research, such as the thermal changes in a domestic environment.[14] Callender extended and updated Davison's scientific research. He continued it to the postwar period, actively participating in the theorization of the glass and metal curtain wall structure.

In 1955, Princeton University School of Architecture published a research report, *Curtain Walls of Stainless Steel: A Study Prepared for the Committee of Stainless Steel Producers, American Iron and Steel Institute*. This report was one of the first studies on curtain walls and Callender led the research. There were four people involved in the project, two of whom were faculty members: associate professor Henry A. Jandl and

[14] John Hancock Callender, "The Scientific Approach to Design," *Prefabricated Homes* 1, No.1 (May 1943): 6+. Also, John H. Callender, *Introduction to Studies of Family Living*, (John B. Pierce Foundation, December 1943).

director of the school and project supervisor, Robert W. McLaughlin.[15] Considering that the third person was a research assistant, it is clear that Callender provided the team with his theoretical and technical expertise on curtain wall systems.[16] While Callender had accumulated much knowledge on curtain walls while working with SOM before WWII, the firm also provided some of the best examples of glass and metal curtain walls such as at Heinz Vinegar Plant in Pittsburgh (1950-52), Greyhound Bus Terminal in Chicago (1949-53), and Lever House in New York City (1951-52).

Describing the changing concept of the wall in the first half of the twentieth century, the report argued that the wall would evolve to be more active. It was expected to "perform a number of rather intricate operations" such as excluding moisture and dirt, insects and unwanted animals and people, as well as allowing easy control of indoor environment. The wall played "so important a part in the control of environment that it

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[15] *Curtain Walls of Stainless Steel, A Study Prepared for the Committee of Stainless Steel Producers, American Iron and Steel Institute*, (Princeton, NJ: School of Architecture, Princeton University, 1955). Robert W. McLaughlin, director of the School of Architecture and project supervisor for the report, emphasized the contribution made by Callender and James C. Ritchie (Research Assistant) in the "Foreword" of the report. "Messrs. John Hancock Callender and James C. Ritchie were actively engaged on this study of the School of Architecture on a full time basis, and the substantial body of the work is theirs."

[16] It is worth noting that Callender, McLaughlin, and Skidmore worked on prefabrication before the Second World War. McLaughlin worked on prefabrication in the 1930s. He was also introduced as one of the pioneers in prefabrication research by one of the Pierce Foundation's publications: Alfred Bruce and Harold Sandbank, *A History of Prefabrication* (New York: Arno, 1944). In 1955, McLaughlin was director of the school. Callender was leading the research and Skidmore was serving as a member of the Advisory Council of the School of Architecture.

can almost be considered as *mechanical equipment*."[17] The wall and mechanical equipment merged into one. The report contended that "the wall of a building is analogous to the skin of the body which is not just a covering but is an active and important organ of the body."[18] As the layer of thin skin incorporated equipment and merged together, the conventional separation of wall versus structure began to dissolve. Owings's own idea of sufficient equipment for maximum flexibility is in principle very similar to this concept of a wall as mechanical equipment. Owings believed equipment, a wall or a lighting system, would help achieve maximum flexibility and desirable spatial and formal effects. The concept of a curtain wall as "the skin of the body" aimed at creating maximum flexibility within a thin layer of a wall.

The Princeton report classified curtain wall systems into six categories (fig. 3. 5). It argued that "the classification of the curtain wall was based on the construction of the wall and not on its finished appearance," because it was "often impossible to tell by looking at a finished building which type of curtain wall unit was used."[19] However, this ambiguity was reduced when the classification was simplified categorically. In October 1956, the American Building Research Institute (ABRI) organized a conference and

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[17] *Curtain Walls of Stainless Steel*, 11-12.

[18] Ibid, 12.

[19] Ibid.

further developed the definition of the curtain wall proposed by the Princeton report. At the conference, it was argued that “the first classification of curtain walls should be based on appearance.” They believed that “almost any system of construction can be used to achieve any one of the common curtain wall appearances.”[20] ABRI proposed four basic visual characteristics: sheath, grid, mullion, and spandrel (fig. 3.6). The sheath type has no indication of structural elements. The grid type expresses horizontal and vertical structural elements equally. The mullion type emphasizes vertical structural elements. Finally, the spandrel type emphasizes horizontal structural elements.[21] These four types were derived from the eight different classifications proposed by the Princeton report.

The curtain wall could emphasize either the building structure or the skin-like covering. The building structure could be horizontal, vertical or both. The façade believed to have more possibilities if the curtain wall did not express the structure. “In the case of facades with depth, he has a wide choice of patterns formed by wall, sunshades, balconies and recesses.”[22] This level of flexibility was limited because it was only applicable on the surface. Nevertheless, the curtain wall was believed to produce enough variety. That

[20] Quotation in the 1956 ABRI conference in “Syntax: The Contribution of the Curtain Wall to the New Vernacular,” Ian McCallum, ed., Machine Made America, special issue of *Architecture Review* 121, No. 724 (May 1957): 299.

[21] Ibid, 300.

[22] *Curtain Walls of Stainless Steel*, 15.

was why the Princeton report argued that, "If curtain wall buildings do begin to look alike, it will be from the architect's choice, not from technical necessity."[23] They believed the orthogonal wall frame could create various distinctive expressions. Formal explorations of the grid pattern had yet to be explored.

SOM's contribution to modern architecture is precisely situated in this context. Initially proposed as a modernization of building technology, the curtain wall resurfaced as an essential design consideration. It then became the focus of a design. The curtain wall became, in the post-war period, a mechanism for internal flexibility; reconfiguring the relationships among interior and exterior spaces, volume and mass, and solidity and transparency. In sum, SOM attempted to advance a new language of glass and steel curtain walls by producing exemplary projects throughout the 1950s.

Owings's Ideal Office Building

Although Gordon Bunshaft was the chief designer of the Lever House, SOM's first curtain-wall building, Nathaniel Owings had an undeniable influence on the design. This is quite evident in a paper he presented to the Building Managers Association in 1947, published a few months later as "A Radically New Conception of Tomorrow's

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[23] Ibid.

Office Building" in the *National Real Estate and Building Journal* (fig. 3.7).[24]

Owings did not justify his idea of the new office building based on aesthetic or ideological grounds. Instead, his justification was mainly technical and monetary. Convinced that urban centers had reached their maximum capacities, "traffic-wise, parking-wise and merchandise volume-wise," he envisioned new office buildings that would give urban workers a more pleasant environment. This new environment would not require many changes. On the contrary, "it will require nothing particularly new to this, merely an assembly and combination of known facts and techniques with an eye to the development of a merchandise-wise package that will stand up and hold a market against depressions."[25]

Instead of a modern aesthetic, economy and comfort were his primary concerns. Owings recommended an entirely controlled indoor environment through air conditioning behind "fixed, flush continuous windows," and the "sealed sash and the acoustical treatment of the ceilings" for sound control.[26] Sealing all glass walls with inoperable windows was more economical than traditional windows. First of all, operable windows

[24] Nathaniel A. Owings, "A Radically New Conception of Tomorrow's Office Building," *National Real Estate and Building Journal* (January 1948).

[25] Owings, "A Radically New Conception of Tomorrow's Office Building," 28.

[26] Ibid.

were more expensive to install. Second, fixed glazing would reduce the frequency of interior cleaning by keeping out dirt and grime. He also believed that fixed glazing would reduce the costs of heating and air-conditioning. Owings imagined the surface of the building as non-corrosive metal and glass that would not need any painting. The building would require a flush skin surface, with metal connections for the glass on the interior. By doing so, an automatic window washing system could be installed. Windows would be washed with a vertical automatic squeegee that would run on exterior tracks. Owings thought the cost of washing windows would be significantly reduced with the introduction of this system.[27] To fabricate such an economically advanced wall system required SOM's previous knowledge and application of prefabrication.

Wall units made of modern materials such as aluminum, stainless steel, other alloys and some plastic should be prefabricated in a factory in order to build quicker and more economically. The ideal office floor would be "one great slab – no bases or permanent partitions to be incorporated." The lightest type of concrete slab construction on a steel frame would reduce dead loads to the minimum. With all these efforts, the office building would embody a lightness "from its environment to its construction."[28]

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[27] Ibid, 29.

[28] Ibid.

Owings presented his ideas on the ideal office building again in *Architectural Forum* in August 1949. While this slightly edited version showed little difference in the general argument, it was thematically organized. Items such as “set in a private park,” “prefabricated walls,” and “low maintenance cost” were separated from each other in order to add clarity. In addition to this new organization, Owings added a new summary that encompassed all the main issues concerning the new office building. His first consideration was a relatively large site for sun light, air circulation, view and sufficient parking. Owings suggested that having grass, trees, and fountains were a “merchantable asset” to win competition in the market. Owings also discussed specifics of the office space.

> We believe that the office space should be a simple, flexible, rectangular plan with the thinnest possible skin and the maximum amount of glass, that all the known scientific devices for control of sound, temperature, humidity, and natural and artificial light are *mandatory*, not just desirable.
> We believe that the modern office building must be designed to provide for the human beings, who spend a quarter or more of their lives therein, all of the comforts, conveniences, and amenities that modern science tells us we need and tells us how to provide.
> This solution is arrived at through studying the behavior patterns, the actual physical, mental and emotional cycle for each of the basic types of occupant. By this research we establish the criteria for the space, means of access to it, and materials and mechanical devices

that will be required to serve it.[29]

Owings insisted if office spaces were more desirable, people would not mind paying more. There was little consideration for aesthetics in conceiving of a new type of office building. Technical and economic reasoning came to be the main focus. Nonetheless, Owings envisioned the future of the glass and metal office buildings and the idea of flexible space. He visualized an office with a "simple, flexible, regular plan" wrapped around by a thin layer of glass. This glass curtain would be an advanced wall, allowing tenants to efficiently control the indoor environment, as later conceptualized in the Princeton report. Owings emphasized the importance of understanding various human responses to the environment, revealing the influence of the firm's relations with the Pierce Foundation in previous years. This practical approach to office buildings was the foundation of SOM's architectural practice before it began to refine surfaces and interior spaces in the early 1950s.

Lever House as an Urban and Corporate Icon

Owings's ideal office building became a blueprint for the 1949 Greyhound Bus Terminal

[29] Nathaniel A. Owings, "The Ideal Office Building" was included in "Bus Terminal and Office Building," *Architectural Forum* (August 1949): 168.

Project in Chicago, but its principal influence was in New York (fig. 3.8) (fig. 3.9). The technical and economic aspects of Owings's article and the terminal project would guide the early design development of Lever House.[30] There are clear similarities to the tower design he published in the article, notably, the treatment of the two volumes. The vertical volume sits on top of the lower horizontal volume as in Lever House. In the lower volume, the first floor is intended to be commercial space such as shops, then two to three floors of parking and a roof garden that would be landscaped and available for tower residents. Owings stated that the vertical volume sitting on top of the horizontal should have no setbacks, giving a similar straight surface. He later noted that he contributed two basic ideas to the design of Lever House: first not putting stores at the street level and, second, putting the tower perpendicular to Park Avenue instead of parallel, giving all the rest of the credit to Bunshaft.[31] However, it is obvious Owings made other significant contributions to the early development of the design. It is not surprising that Bunshaft was not able to "explain how he decided upon the *parti*."[32]

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[30] "Bus Terminal and Office Building," *Architectural Forum* (August 1949): 70-75, 164, 168. "Greyhound's New Chicago Terminal," *Architectural Record* (April 1954): 167-73. This article lists the similarities and differences between the terminal project and Lever House.

[31] Nathaniel A. Owings, *The Spaces In Between: An Architect's Journey* (Boston: Houghton Mifflin Co., 1973), 108-09.

[32] Carol Herselle Krinsky, *Gordon Bunshaft of Skidmore, Owings, & Merrill* (New York: Architectural History Foundation; Cambridge, MA: MIT Press, 1988), 22.

Lever House was begun in 1949 when Lever Brothers Company, manufacturer of soap, detergents, cosmetics, toothpaste and oleomargarine, decided to move its center of operations from Boston to New York City. Charles Luckman, president of the company and trained architect, commissioned SOM to design a modern headquarters for its exclusive use.[33] The project was completed in December 1951 and officially opened four months later (fig. 3.10). This new glass-walled office building received immediate accolade, from architects and critics. *New York Times* architecture critic Aline B. Louchheim called it “the most inventive, handsome and remarkable of the firm’s buildings.”[34] The mayor of the city, Vincent R. Impellitteri, welcomed Lever House, calling it “the new showplace of Manhattan.”[35] Boasting meticulously designed volumes as well as a glass and steel frame, this new building revolutionized the design of skyscrapers.

Lever House is a twenty-one story building consisting of a tall tower and a low, two-story horizontal volume which serves as office space and provides a colonnade and enclosure for the open court (fig. 3.11) (fig. 3.12) (fig. 3.13). The layout of Lever House is simple. There is a roughly square, two-story horizontal volume that covers the whole

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[33] “Landmarks Preservation Commission,” November 9, 1982, Designation List 162, Lp-1277, 2.

[34] Aline B. Louchheim, “Architecture Of and For Our Day,” *New York Times*, September 24, 1950.

[35] “Doors Swing Open in House of Glass,” *New York Times*, April 30, 1952.

plot. It is located along Park Avenue between Fifty-third and Fifty-fourth. The tall, narrow, and oblong tower sits on top of the pedestal, turning the narrow side to Park Avenue. This twenty-one story high tower housed the company's offices. The pedestal included a courtyard open to the streets with no stores along the streets. In a sealed building, heat was an important consideration. As a result, air conditioning and fluorescent lighting covered by glass diffusing lenses were employed to reduce heat emission. Air conditioning was incorporated by means of a split system: individual window units for the glazed periphery of the structure fed with high-pressure water and air and, in the center of the office space, a duct system of high velocity. Heat absorbing glass would block much of the heat created by direct sunlight as well as effectively reduce glare.[36]

There were other technical achievements as well. SOM invented a window washer, which would allow for easy cleaning of the smooth wall. The invention of the window washer became of great interest to the popular press.[37] The glass was held in place by thin aluminum mullions and arranged in a pattern based on the varied sizes of the panes. The elegant, green-tinted glass skin covers the walls of the building. Curtain walls help achieve a consistent exterior surface, leaving zero manually operated windows

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[36] "Lever House Complete," *Architectural Forum* (June 1952): 109.

[37] "Window Washers in Gondola Car Speed Cleaning of Glass Building," *New York Times*, April 1, 1951, 31. The newspaper reported that "Only two men will be needed to keep the windows of Lever House clean… the entire building exterior can be washed by the two men in only six days."

(fig. 3.14). Thus, in the daytime, glass conceals the internal structure.

Compared to the United Nations Secretariat building, which was built a couple of years earlier, Lever House had a smoother skin. While the former had a four inch deep frame around the exterior glass to create shadows and accentuate the pattern, the latter has a one inch projected frame with two and a half inch wide mullions.[38] This flatness was part of the architects' effort to communicate with the public. In contrast to Mies's Lakeshore Drive apartments (1948) with "subtleties of modeling and historical associations" that could immediately appeal to architects but not to the public, the Lever building seemed to offer "a direct line of communication." The editors of *Architectural Review* speculated that "most of the marketed curtain walls strive for an effect of flatness rather than relief in the façade," and "in so many of them the scale and proportions of the frames and panels seem to relate to the Lever prototype."[39]

However, the flatness also received a level of criticism. Robert W. McLaughlin believed that there would be a divergence from the "fetish for flatness." He argued that it would happen "not only on aesthetic grounds, because there is certainly a dreariness in

[38] "Miniature Skyscraper of Blue Glass and Metal Challenges Postwar Craze for Over-building City Lots," *Architectural Forum* 92 (June 1950): 86.

[39] "Syntax," 307. Regarding this issue of "communication" through curtain walls, Reinhold Martin provides a provocative, yet well established argument. Reinhold Martin, *The Organizational Complex: Architecture, Media, and Corporate Space* (Cambridge, MA.: MIT Press, 2003). Particularly appropriate are the second and third chapters, "Pattern-Seeing" and "The Physiognomy of the Office."

flatness when repeated without relief, but also on human grounds, since the flat walls do not accomplish as filters the best results in filtering in and out desirable and undesirable environmental factors."[40] Regardless, Owings made it clear that his ideal office would have "a simple, flexible, rectangular plan with the thinnest possible skin and the maximum amount of glass."[41]

Creating an institutional identity for the company was an important goal at Lever House from the beginning. A refined glass box would advertize the "giant soap maker."[42] Luckman and the other executives at Lever Brothers understood the project as an advertisement. Other commentators did as well.

> In the three short months since its opening, blazoned Sunday supplements, full-page newspaper advertisements, and enthusiastic popular magazines have made it better known to the public than Mies' Tugendhad house, Eames' steel-framed oceanside bungalow, Le Corbusier's Marseilles apartment house, and Wright's Johnson Wax Factory combined – to name a few landmarks in modern shelter design.[43]

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[40] Robert W. McLaughlin, quotation from ABRI Conference in "Syntax," 308.

[41] Owings, "The Ideal Office Building," 168.

[42] "Miniature Skyscraper of Blue Glass and Metal," 86.

[43] "New York's Blue Glass Tower: An Insider's View," *Contract Interiors* (August 1952): 59.

The enormous popularity of Lever House was not merely a result of corporate advertisement; the building provided the city with a new architectural expression. Four years after its opening, *Architectural Forum* ranked the building as the third most important office building for the past one hundred years.[44] The architectural ingenuity and novelty of the glass-walled building was well recognized. One of the most thorough analyses of the structure came from Lewis Mumford.

> This whole structure is chastely free of advertisement; the minuscule glass cases showing life-size packages of Lever products in the glass-enclosed reception chamber on the ground floor would hardly be noticed in the lobby of a good hotel. But, the building itself is a showcase and advertisement; in its very avoidance of vulgar forms of publicity, it has become one of the most valuable pieces of advertising a big commercial enterprise could conceive.[45]

As Mumford correctly pointed out, the building itself became both a showcase and an advertisement. By getting rid of any recognizable signs on the outside, the unique glass-walled building transformed itself into a sign. The institutional characteristic of the

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[44] "Office Buildings," *Architectural Forum* (June 1956): 151. Maurice Lavanoux commented on the building, "After several decades of clouded and misty architecture, I find it refreshing to see the clear glass shaft of Lever House rising in the otherwise drab atmosphere. And I hope the free area at the base of the building is a forerunner of more open spaces which help to reduce the tension of our daily life. In a way, the Lever House reflects the product of the Company and so the great areas of glass are here justified. Even so, all in all, it is a clear and pleasing silhouette in our city of towers."

[45] Lewis Mumford, "The Sky Line: House of Glass," *New Yorker*, August 9, 1952: 48.

building surfaced when the decorative signs disappeared, and the building represented the company it housed in an abstract manner. The executives at Lever Brother's wanted to associate their products with the building. This was not limited to simple association through advertisement. Architecturally, as Mumford realized, Lever House was "the first office building in which modern materials, modern construction and modern functions have been combined with a modern plan."[46] By weaving these various aspects into a seamless entity, the building easily became comprehensible to the public as well as to architects and critics. This consistency of being modern in construction, function and interior organization gave the company a distinctive air of being new and advanced.

However, this does not mean there were no discrepancies. There was an abrupt transition between the exterior and interior of the building. Yet here too we find connections. Bunshaft joined SOM (then, Skidmore and Owings) in 1937 after working for Raymond Loewy, an industrial designer, for several months. When Luckman and SOM reached an agreement on designing a new headquarters, the president put in a condition that Raymond Loewy Associates would do the interior design of the building.[47] Loewy had long been associated with the company and had been responsible for its

[46] Ibid, 53.

[47] Gordon Bunshaft, *Oral History of Gordon Bunshaft*, 158.

commercially successful product packaging.[48] He also had architectural experience. Loewy expanded his business beyond industrial and graphic design projects in 1937 when he added a Department of Architecture and Interior Design to his firm. He designed a cafeteria and its interior for Lever Brothers when the company was located in Boston.[49] Luckman, Raymond Loewy and SOM shared business sensibilities and worked successfully together.

Nonetheless, the differences help anticipate SOM's design ambitions for creating a building holistically. Donald Albrecht contended that Loewy's design expressed "the hierarchical nature of mid-20th-century corporate culture." Loewy organized the interior to proceed with gradual changes from "public to private, open to closed, common to elite."[50] Hierarchy, never limited to the spatial organization, was in part concealed by the organic' quality of the interior design (fig. 3.15) (fig. 3.16). *Architectural Forum* in 1952 reported that designers of the Loewy firm designed interiors "on a very firm basis of efficiency, sales atmosphere, and comfort." While it was an effort to design efficient yet accessible space, it sometimes reinforced the contraction between

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[48] Aline B. Louchheim, "Newest Building in the New Style," *New York Times*, April 27, 1952, X9.

[49] Charles Luckman, *Twice in a Lifetime: From Soap to Skyscraper* (New York and London: W.W. Norton Co., 1988), 198.

[50] Donald Albrecht, "House of the Rising SOM," *Interiors* (December 2000): 61.

the stark prismatic form on the exterior and comfortable, streamlined interior. One extreme case was the executive floor. Three executives asked for wood-burning fireplaces in their top-floor air-conditioned office and actually received them (fig. 3.17).[51] The interior was extremely well organized; “In all working spaces the interior design is so efficient a fulfillment of the use requirements of the building that esthetic problems seem almost incidental.”[52] Aline B. Louchheim already mentioned this point as early as 1952 stating “their esthetically vulgar ‘conspicuous consumption’ seems raucously at variance with the spirit and style of the architecture.”[53]

In contrast, the interior design of the third-floor cafeteria, a space accessible to all Lever employees, expressed a cheerful message of the egalitarian corporate family (fig. 3.18). Loewy provided simple, tailored furnishings largely detached from the glass walls that mirror SOM’s sharp, rectangular architecture. In addition, some furniture contained the streamlined aesthetic of the 1930s. The interior of the building was designed to symbolize Manhattan street traffic lines with horizontally striped draperies, metal screened partitions, and a tile floor.[54] After explaining air-conditioning, acoustical

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[51] “Lever House Complete,” 109.

[52] “New York’s Blue Glass Tower,” 152.

[53] Aline B. Louchheim, “Newest Building in the New Style,” X9.

[54] Albrecht, “House of the Rising SOM,” 61.

control, lighting and elevators, *Architectural Forum* concisely stated, “Interior comfort is produced mechanically.”[55] Although both the interior and exterior designs were based on the same four-foot, eight-inch module, the differences between inside and outside reveal a wide gap. Lever House gave SOM a chance to realize the importance of the holistic design to a large-scale building project.

When the model of Lever House was first shown to the public at the Museum of Modern Art in 1950 for the show, Skidmore, Owings & Merrill, Architects, USA, some felt the fear of working in a glass box during the era of the atomic bomb. A visitor named L. J. Salter wrote a letter to the museum pointing out the absurdity of building a flimsy glass building in the era of atomic war.

> This is the reality which most advanced architects are blindly ignoring. In the face of contemporary political and military possibilities, they continue piling humans into glass cells in the cities, exposing them to as serious hazards as the thousands huddled in Hiroshema's [sic] slums! One has but to vision the state of things, had Hiroshema had a few of the glass structures visioned in your Bulletin.
>
> So long as economic and political differences between nations remain un-reconciled, the threat of total destruction spells the end of 'city culture' as you know it today. Wealth, therein concentrated in the form of 'property', becomes worthless. A thing is 'worthless' when there are no 'buyers' -- and who will venture (invest) against

55 “Lever House Complete,” 109.

> the threat of A-bombs?[56]

The author of the letter combined the images of a fragile glass wall and the devastation of Hiroshima after the bomb. A tall glass skyscraper appeared entirely unreasonable to some people. They thought it was nonsense to think of the new building's cultural or commercial value in a time of imminent atomic war.

When Lever House was completed, the world was divided into eastern and western blocks. The Cold War had intensified with the Soviet Union's announcement of its first successful detonation of an atomic device in 1949. Furthermore, the United States was deeply engaged in the Korean War (1950-53). This post-war international unrest infiltrated into the country's social and architectural culture. However, architectural experimentations were not stopped. Although there was fear of voyeurism and vulnerability, SOM designed a building with a flat glass wall. Lever House was to some extent a continuation of various architectural experimentations with a glass wall. Lewis Mumford found a positive aspect in Lever House.

> Lever House, by reason of the internal consistency in its design, is at the very least a highly useful experiment. Fragile, exquisite,

[56] L. J. Salter. Letter to the Museum of Modern Art about the 1950 Skidmore, Owings & Merrill Exhibition at the museum. October 31, 1950. MoMA Exh.#459.

> undaunted by the threat of being melted into a puddle by an atomic bomb, this building is a laughing refutation of "imperialist warmongering," and so it becomes an implicit symbol of hope for a peaceful world.[57]

Mumford saw Lever House as a positive gesture because it did not surrender to the fear of a possibly imminent catastrophe. It was an expression of confidence in a peaceful future. Corporations needed both peace and confidence to prosper and expand.

Manufacturers' Trust Company Bank

Only five-stories high, the Manufacturers' Trust Company Bank, completed in October 1954, is an example of architecture's contribution to the embodiment of a new banking system (fig. 3.19). This building gave a new type expression to post-war banks. Located at 43rd Street and 5th Avenue in New York City, Manufacturers' Trust Company Bank was designed by William S. Brown (coordination) and Gordon Bunshaft (design). Other collaborators included the interior designer Eleanor LeMaire, landscape architects Clarke & Rapuano, artist Harry Bertoia, and industrial designer Henry Dreyfuss. Despite its relatively small size, this bank is one of the most successful embodiments of teamwork from different disciplines. In addition to its formal innovations, the building presented

[57] Mumford, "The Sky Line: House of Glass," 54.

itself as a critical example of post-war architecture, attempting to reorganize urban space in the American city.

The building has a clear structural composition and meticulously designed details. A transparent glass box packed with elaborate mullion profiles, make up the building. The slabs behind the skin seem suspended in the air, eliminating any weight from the surface. The continuous horizontal lines of the interior and the grid-pattern on the façade create a sense of endless expansion and control (fig. 3.20). Due to its unique cantilever structure, there are only eight exposed columns, all of which look like freestanding objects. The offices and banking facilities are grouped according to function and located on the four main floors with the penthouse on the fifth floor. Mechanical and employee facilities are on the lower level (fig. 3.21).

The main entrance, just off Fifth Avenue, is marked by two large double doors of plate glass divided by a panel of polished Canadian black granite, into which the night deposit facility is recessed (fig. 3.22). The first floor is devoted primarily to quick, convenient handling of the large volume of everyday banking transactions. The repetition of the grid on the ceiling and floor creates a sense of order and purpose. In addition, the bands on the ceiling serve to unite the air conditioning diffusers. The Otis escalators, which create dynamism from both inside and outside, deliver customers to the main banking area located on the second floor.

A metal screen by Bertoia stands below the grids (fig. 3.23) (fig. 3. 24). Stretching seventy feet long, sixteen feet high and weighing six-tons, this sculptured screen functions as a partition wall while the escalators function as artistic instruments. The luminous ceilings, a product of the Marlux Corporation, greatly reduce the reflectivity of the glass wall in the daytime.

The formal characteristics of the bank were not independent from the changes in the United States banking system. Horace C. Flanigan, the president of the bank at the time, indicated that "banking today is selling a service, and is to a great extent comparable with department stores and specialty shops where the aim is to provide inviting quarters and an attractive atmosphere as well as to sell quality merchandise."[58] Accordingly, the building embodied this change with huge glass curtain walls set in polished aluminum frames (fig. 3.25). Ada L. Huxtable, the eminent American architecture critic, contended that "with deposits federally insured, banks are selling services, not security."[59] Gordon Bunshaft of SOM also proudly recalled, "The main contribution of Manufacturers Trust was that it broke the masonry-fortress psychology of

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[58] Horace C. Flanigan, quote from "1954 Building News: A Glass Bank and Two New Office Buildings," *The Architectural Record* (October 1953): 10.

[59] Ada Louise Huxtable, "Bankers' Showcase," *Arts Digest*, December 1, 1954: 12.

branch banks up to then."[60] Until then, popular taste identified banks as massive, marble faced buildings. With the transparency of the Manufactures' Trust Company Bank, SOM conceived of a new bank style of glass and steel with which the financial institution was entirely satisfied.

From Fifth Avenue, there is no sign of the function of the building except the shining vault door. The door was placed on the dark screen only ten feet away from the exterior glass wall (fig. 3.26). The vault, made of stainless steel and polished bronze, resulted from the collaboration between noted industrial designer Henry Dreyfuss, the architects of SOM, and the engineers of the Mosler Safe Company. It is argued that, mechanically, the thirty ton closure was so delicately balanced that it could be swung by a finger. Symbolically, it ensures that customers' money is safe behind the sleek, metallic vault. Trust is established with the symbolic gesture that the employees' actions can be seen through the transparent glass. Thus, "More than any single element, the vault door characterizes a bank building as a bank."[61] The vault functions perfectly as a bank icon and is a part of Dreyfuss's later exploration of 'universal symbols' illustrated in *Symbol*

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[60] Gordon Bunshaft, quote in "Lantern on Fifth Avenue," *Progressive Architecture* (January 1973): 108.

[61] "Vault Doors Revamped by Dreyfuss Complement Modern Banks," *The Architectural Forum* (November 1954): 169.

Sourcebook (fig. 3.27).[62]

Dreyfuss described his experience with the Mosler Safe in his autobiography, *Designing for People*; he wrote, “Our directive from the Mosler Safe Company was to incorporate their engineering staff’s improvements into a new concept that would reflect modern banking and contemporary architecture, yet still give the customer the feeling of security that is essential to the renters of safe-deposit boxes.”[63] A grilled gate with seven up-titled pikes was replaced with one simple mechanism without pikes and only one handle and two dials (fig. 3.28). While the original vault door revealed the inner mechanism of the vault, Dreyfuss’s design concealed it and invented a rather elegant new surface.

Lewis Mumford characterized the appearance of the building as “a paradoxical combination of transparence and solidity.”[64] The vault provided the building with a feeling of solid stillness entirely opposed to the open, flowing, transparent space, represented by emptiness and dynamic movements inside. The vault door was kept open during the day and was continuously emphasized by a spotlight at night. Mumford

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[62] Henry Dreyfuss, *Symbol Sourcebook: An Authoritative Guide to International Graphic Symbols* (New York: McGraw-Hill, 1972).

[63] Henry Dreyfuss, *Designing for People* (New York: Simon and Schuster, 1955), 156.

[64] Lewis Mumford, “The Skyline: Crystal Lantern,” *The New Yorker*, November 13, 1954: 197.

correctly pointed out that it was “the most impressive possible symbol of security” and “a natural advertisement.” He continued to say that “this is what one might call inherent symbolism.”[65] Combining a sense of security with advertisement, ‘inherent symbolism’ over-achieved its purpose. The door has become a universal symbol, which overcomes its heavy materiality. It became the most effective “window display.”[66] The display is not a display of objects, but a new relationship in the flexible system of accumulation of capital in the post-war period. The shining vault door, black marble wall, and almost clear glass wall, as well as the city, the spectator, and the dim reflection of him self-represented the world of liberated phantasmagoric images (fig. 3.29).

Huxtable proposed an advanced reading of the building, stating that, “The whole, viewed from the outside, is no longer architectural in the traditional sense: it is a design, not a substance, but of color, light and motion.”[67] When seen from the Fifth Avenue, the building seems to have virtually no physical presence except for the thick metal frames. The glass walls simply disappear, leaving only omnipresent grids. The bank becomes a design of color, light and motion. Any objects between the grids appear to be

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[65] Ibid, 200.

[66] “Manufacturers Trust Company Builds Conversation Piece on Fifth Avenue,” *The Architectural Record* (November 1954): 150.

[67] Huxtable, “Bankers’ Showcase,” 13.

released from their traditional roles and associations. When surrounded by the grids, human figures look like they are flowing, rather than occupying fixed space and time.

From inside, another impact of the largest glass pane of the time became quite apparent. Jack Alexander of the *Saturday Evening Post* reported in 1957 that female employees were conscious of "being constantly on display-before sidewalk crowds, workers in nearby buildings and parties passing through on conducted tour." A "more noticeable effect on personal habits and grooming" was observable among the two hundred female employees (fig. 3.30). A female worker explained, "You can't help being alert and pleasant when you know that you are performing in a showcase."[68] The acts of seeing and being seen were violently intensified inside the glass box (fig. 3.31).

However, the interaction was purely visual. The bank, although seemingly open, was physically sealed. Alexander writes, "To those on the inside, the traffic noises of midtown seem muted and remote and the bank itself a quiet, luxurious enclave in a rackety, hurried world whose atmosphere is polluted with soot and exhaust gases."[69] The glass box creates an entirely sterile, enclosed environment within the bustling city. Therefore, the gestures and interactions created by the bank are non-communicative.

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[68] Jack Alexander, "The Bank That Has No Secrets," *The Saturday Evening Post*, November 30, 1957: 105.

[69] Ibid.

There are pure gestures and empty interactions. The distance between inside and outside becomes infinite and at the same time non-existent.

The bank also creates an interior park, or a hole, on Fifth Avenue where urban architecture sacrifices its materiality and solidity to visualize the post-war urban space as dynamic, yet inaccessible and incommunicable (fig. 3.32). The vertical and horizontal lines created by the endless repetition of the module seem lightweight, yet they expand in all directions. This creates a mysterious sense of depth along with an open, continuous space. Free, dynamic, yet almost depthless interactions among objects and people exemplify a new experience of urban space initiated by the postwar economic and political transformation in the post-war American city. There is no attempt to rebuild the urban fabric in the heart of the city, simply an intensification of the human experience that has been liberated from the urban fabric. The post-war urban space of New York City was gradually being fragmented and transformed into a spectacle.

The U.S. Air Force Academy

SOM's rise in the 1950s would not have been conceivable without its involvement with the military-industrial complex. Large corporations of the country collaborated with the military during and after the war. The Manhattan Project, in which SOM played an important role, is a good example of this. Although the term, “military-industrial complex,” became popular after President Dwight D. Eisenhower’s farewell address in January, 1961, its growing power was apparent during the Second World War. Beginning with the Cold War, the military-industrial complex grew stronger, and SOM greatly benefitted from being a part of it. Designing and constructing large military bases or airports in foreign countries, SOM embodied a new image of the American military institution with modern visual language. The United States Air Force Academy exemplifies this.

On May 15, 1955, the U.S. Air Force (USAF) announced plans for its Academy project in Colorado Springs. Created as a direct result of the National Security Act of 1947, the USAF would formulate a new direction for the American military.[70] The lawmakers hoped to provide a comprehensive program for the future security of the country through three military departments – the Army, the Navy (including Naval Aviation and the Marine Corps), and the Air Force – providing coordination and unified direction under civilian control without merging them.[71]

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[70] "On September 18, 1947, Chief Justice Fred M. Vinson administered the oath of office to the first Secretary of the Air Force, W. Stuart Symington. Gen. Carl Spaatz was sworn in as the first Chief of Staff, United States Air Force, on September 26…. And thus began a new era in which airpower became firmly established as the nation's first line of defense and its chief hope for deterring war." *A History of The United States Air Force 1907-1957*, ed. Alfred Goldberg (Princeton, NJ: D. Van Nostrand Company, Inc. 1957), 99.

[71] Ibid, 99.

The Air Force initially had difficulty securing an adequate source of trained officers. In 1949, the Army and the Navy agreed to allow twenty-five percent of the graduating classes at the Military Academy at West Point and the Naval Academy at Annapolis to accept commissions in the Air Force.[72] There was an urgent need to establish an independent system for recruiting officers and to formulate a strong identity among them. Although President Truman signed the legislation that created a separate Air Force, it was President Eisenhower who appointed Harold E. Talbott as Secretary of the USAF in 1953. Talbott materialized the Air Force Academy project. When the U.S. Congress authorized the creation of the Academy in April 1954, Talbott began to search for a permanent site. Two months later, he chose a site on the east slope of the Rampart Range of the Rocky Mountains near Colorado Springs (fig. 3.33) (fig. 3.34) (fig. 3.35).[73]

The leaders of the academy knew they had to find a new way to train highly motivated cadets because "the authoritarian style of command of the traditional military was simply ineffective."[74] Like civilian organizations with similar problems, the Air

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[72] Goldberg, *A History of The United States Air Force 1907-1957*, 162.

[73] "United States Air Force Academy, CO," http://www.globalsecurity.org/military/facility/usafa.htm.

[74] Richard Gid Powers, "The Cold War in the Rockies: American Ideology and the Air Force Academy Design," *Art Journal* (Summer 1974): 311.

Force chose to follow the “business school approach to organized decision-making."[75] In other words, facing a totally new organizational challenge, the Air Force and its academy tried to imitate business.

Today it seems obvious that SOM was selected for the project considering the firm had successfully completed many projects with corporate clients with similar aspirations. Yet, the process shows SOM’s ongoing evolution. From the large number of applicants, the Selection Board chose a small number of the firms to interview representatives. Among them were SOM, Kittyhawk Associates, Eero Saarinen, Harrison and Abramovitz, Pietro Belluschi, and Pereira and Luckman. After seeing the site, Owings decided against submitting a sketch design for the final interview, wanting to be free of *a priori* choices. Instead, he presented a work progress chart, from master planning and design through the construction phase, showing the firm's intentions with regard to research, programming, scheduling and design. Owings wrote that, "Our own presentation consisted of fifteen panels, each devoted to one aspect of the total problem: research, programming, scheduling and design of the academy."[76] SOM emphasized the process of design and its ability to manage the complexities of the project.[77] This unique

[75] Ibid.

[76] Owings, *The Spaces In Between*, 152.

approach in fact resulted from SOM's experiences with the military both during and after the Second World War.

Owings's gamble proved worthwhile since SOM was awarded the contract on July 23, 1954.[78] The design evolved between 1954 and 1957 and construction took place from 1956 to 1962. The project was initially directed by Bunshaft from New York with Walter A. Netsch, Jr. from Chicago. The firm's goal was to create a modern academy that would not repeat the aged images of West Point and Annapolis. Owings recalled that "It would be great to have a hand in creating from scratch a contemporary academy as a counterpoint to Classic Annapolis and Gothic West Point."[79] In June 1955, *Architectural Forum* commented that, "SOM's models indicated their Air Force architecture will be traceable directly to the dynamic tradition of the great airplane hangars and the airplanes themselves. It will be straight, simple U.S.-industrial-age idiom, but with the added refinement of what Owings called 'global style'."[80] SOM followed and updated the glass

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[77] For more information, see Kristen Schaffer, "Creating a National Monument: Planning and Designing the Academy," in *Modernism at Mid-Century*, 29-30.

[78] According to Gordon Bunshaft's recollection, there were two people that Talbott was strongly influenced by: Mrs. Talbott and Farzar Wilde. The former was then the chairman of the New York Infirmary which was designed by SOM, and the latter was an old friend of Talbott and head of Connecticut General Life Insurance. Wilde was enthusiastic about his experience with SOM which had designed the corporate headquarters for the company. See Gordon Bunshaft, "Recollections of Gordon Bunshaft," in *Modernism at Mid-Century*, 186-89.

[79] Owings, *The Spaces In Between*, 150.

[80] "The United States Air Force Academy," *Architectural Forum* (June 1955): 102-04.

and steel precedents of anonymous industrial pioneers, not to mention several well-known leaders in architectural engineering such as Albert Kahn, Mies van der Rohe, Buckminster Fuller and Konrad Wachsmann. At the same time, the architects of SOM devised an artistically sophisticated project.

Despite some support from the Air Force, SOM’s early design raised some public controversy. In 1955, Frank Lloyd Wright went to Washington to testify before Congress, demanding that SOM's design be replaced by one more "in harmony with the rugged mountains and natural beauty of the West."[81] He lambasted the design, calling it “half-baked” and “a birdmen’s factory.”[82] Although the style of the design played a large role in his attack, Wright's opinion was further biased by his own unsuccessful pursuit of the design commission as a member of the Kittyhawk Associates team put together by Cleveland architect Richard Hawley Cutting.[83] Fearful that funding for the project would be withheld indefinitely, Air Force Secretary Harold E. Talbott presented a Senate committee with revised drawings showing the reduced use of glass. In addition, Talbott warned the committee that a whole year would be lost if funds were not provided. The

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[81] *New York Times*, July 16, 1955, 2.

[82] *New York Times*, July 8, 1955, July 4 and 11, 1955, 14.

[83] "Strange Alliances: Frank Lloyd Wright and Congress," in *Modernism at Mid-Century*. 43.

question of style remained a topic of heated public debate. Many architects supported SOM's design as an appropriate expression of function and technology.[84] The *New York Times* ridiculed the Congressional reservations.

> To the congressional mind, untutored in the recondite processes of modern art…[modern] suggests such radical images as Pablo Picasso, one-eyed women, and melting watches…. A plan for the jet age it may be, but the suspicion in Washington is that Congress would breathe easier if the architects would come back with a variation blending Chartres Cathedral and Independence Hall.[85]

To many members of Congress, SOM’s modern design appeared radical and inappropriate for the important military institution. They wanted an authoritative and traditional style built of natural materials such as stone. However, the leaders of the Air Force themselves wanted a modern building which would project its progressive image. Moreover, it was economically unwise to build the Academy in a traditional style with stone. Hanson W. Baldwin wrote for the *New York Times* on July 11, 1955:

> It is probable that when the architectural skirmishing has been finished, the final style that will evolve will be a modified

[84] Ibid, 44.

[85] *New York Times*, July 17, 1955, 7.

> contemporary functional, utilizing much metal and glass. The use of much stone as at West Point and Annapolis is simply too expensive today, Air Force officers say. The total authorization of the Air Force Academy today is $126,000,000. If West Point or Annapolis were to be built today, the cost of either institution probably would be between $250,000,000 and $700,000,000. Despite congressional critics, it seems certain that the cold hard facts of economics will force the architectural style of the new academy into a modified modern mold.[86]

This assessment appears almost prescient. Building the Air Force Academy with a classical style such as at West Point or Annapolis would cost much more than the budget allowed. Modern was economical. In the end, when the debate was over, there was little change in the design.[87] All the buildings were formed almost entirely of gleaming industrial materials such as aluminum, steel and gray tinted glass. Panels of ceramic tile in bright colors stressed the perfection of the machined materials.[88] SOM's choice of a modern design and new materials gave the Academy the appearance of a new, progressive military institution.

SOM designers used modules beginning in the early stages of design, which

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[86] Hanson W. Baldwin, "Air Force Shows Academy Designs," *New York Times*, July 11, 1955, 14.

[87] "Quarles Approves 5 Academy Designs," *New York Times*, October 8, 1955, 10.

[88] "The Air-age Acropolis," *Architectural Forum* (June 1959): 159.

facilitated not only construction but design thinking as well.[89] However, instead of providing multiple examples, it is better to focus on Cadet Dining Hall which best represents the use of modules (fig. 3.36) (fig. 3.37) (fig. 3.38). To accommodate the entire cadet corps in one sitting, this hall provided a two hundred fifty-two feet square, completely column-free dining space. The twenty-four foot high roof structure consisted of forty-six prefabricated steel trusses intersecting at right angles and supported the three hundred and eight foot square roof. The framing rested on sixteen exterior steel columns, four to a side, with cantilevers of twenty-two feet on each of the four sides. The square, coffered, metal ceiling housed light fixtures and air-conditioning outlets and provided for good acoustics.[90] All exterior walls were of plate glass with aluminum mullions. The senior structural designers at SOM utilized a computer system developed at the University of Illinois for calculation. Engineers at the firm suggested the use of the Uni-Vac mainframe computer.[91] This was one of the earliest applications of the computer in structural analysis.[92] SOM architects and engineers took advantage of new technological

89 "United States Air Force Academy," *Architectural Record* (June 1955): 172. It says, "A 3 ft. 6 in. module has been used throughout."

90 Ernst Danz, *Architecture of Skidmore, Owings & Merrill, 1950-1962* (New York, Washington: Frederick A Praeger, 1963), 112.

91 Gertrude Kerbis, *Oral History of Gertrude Kerbis*, Interviewed by Betty J. Blum (The Art Institute of Chicago, 1997), 76.

92 Sheri Olson, "Raising the Roof: The Dramatic Construction of Mitchell Hall," in *Modernism at Mid-*

developments to solve various structural obstacles.

Gertrude Kebris, who participated in the design of the Air Force Academy, recalled that the design of the dining hall was inspired by Mies van der Rohe's Convention Hall Project (1953-54) in Chicago. Although influenced by Mies, SOM engineers materialized the structure by building the roof on the ground and then elevating it into place. At the time, hydraulic lift technology was used for construction in Texas. The SOM engineers and U.S. Steel, who was part of the construction team for the Academy complex, decided to apply this same method. It was the first time a hydraulic lift was applied to steel construction. Mies would employ the same method in the construction of the Berlin National Gallery (1962-68).[93]

The ceiling of SOM's dining hall seems to float in the air since the structural system is hidden, fabricating yet another layer of module (fig. 3.39). Konrad Wachsmann provided a close reading of the ceiling.

> The modular order defines space. Each ceiling panel becomes a mechanical function. Its technically determined form is concentrated in the outlets for lighting, air conditioning, ventilating and communication systems. The room is a combination of self-

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Century, 74-5.

[93] Ibid. For details, Wachsmann, *The Turning Point of Building*, 120-21.

> contained parts, not intended to carry loads or indicate the distribution of forces in the structure. The dominant effect is that linear correlation of the elements.[94]

While the pattern appears simple, the operation of the ventilation and the lighting is meticulous and well concealed (fig. 3.40). SOM designers hid the connections between the roof truss and columns, systematically eliminating tectonic expression. All pieces float as “self-contained parts” in a weightless space. Endless grids of a module hover over empty space (fig. 3.41). The linear correlation of all of the elements shows the repetition and expansion of a module. This weightless, expansive, yet orderly space seems a suitable symbol of the rising military institution. While the chapel was more literally and formally related to the idea of the Air Force, the dining hall represents a similar idea spatially.

The Academy’s interior design and the furnishing of all the items and equipment was done by Walter Dorwin Teague Associates (WDTA). *Pencil Points* called Walter Dorwin Teague the "Master of Design" in September 1937. Diane Cochrane characterized him as the "Great American Design Machine" in *Industrial Design*. WDTA had become one of the largest industrial firms in the United States by the 1950s along

[94] Wachsmann, *The Turning Point of Building*, 109.

with Raymond Loewy Associates, Eliot Noyes and George Nelson. Considering WDTA's experience with large corporations such as Eastman Kodak, Proctor and Gamble and Boeing, it is no wonder why the Air Force chose WDTA.

Industrial Design reported that WDTA won the U.S. Air Force contract: "The U.S. Air Force Academy in Denver has paid a tribute, by deciding that the interior arrangements, equipment and furnishings of all Academy buildings should be the responsibility of industrial design."[95] The task was daunting. It was estimated that 60,000 kinds of equipment and fittings had to be selected and specified, of which some 1,500 would have to be designed.[96] Their interior work included the furnishing of 3.5 million square feet of space – dining halls, dormitory rooms, classrooms, and other areas (fig. 3.42) (fig. 3.43) (fig. 3.44).[97] The firm built full size mock-ups of two of the typical dormitory rooms which made possible the testing of acoustics, lighting, and such

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95 "Teague Wins U.S.A.F. Contract," *Industrial Design* (April 1956): 12.

96 Ibid.

97 Florence Knoll, director of the Knoll Planning Unit, worked with SOM on the Connecticut General Life Insurance Corporation. Her experience illustrates how interior designers worked with the module that SOM decided for a project. Knoll argued that, "the module determined the size of the offices. But it was the mock-up that determined that we downgrade all the sizes. The mock-up hlped us all see that we could go down a size in all the offices, and because of the flexible system of the building it was perfectly easy to do… As matter of fact the furnishing was designed to fit the module in this building. All the chests and cabinets are exactly the same width as the paneling and the desks. Everything throughout the building is actually modular." Florence Knoll in "The Team Approach: A Round-Table Discussion Reveals How Connecticut General Got Just What It Wanted from Designers." *Industrial Design* 5 (September 1958): 54.

furnishing details such as doorknobs and wastebaskets.[98] In order to efficiently operate, WDTA structured the project team into two groups, one located in Denver and the other in New York. A team of twelve designers in Denver worked closely with SOM and the military to get approval on preliminary designs. On the other side, around twenty designers in New York carried out finished or definitive plans based on the Denver group's preliminary designs. The New York team researched the accessibility of commercial items and took part in follow-through on equipment including the preparation of procurement documents.[99]

In the early stage of the design, the Air Force specified four basic requirements to WDTA: economy, standardization, compatibility with SOM's architecture, and furnishings with durability and a life span of fifty years.[100] Encountering the vast and complicated task, WDTA did not confine its mission to simple interior design but, in fact, tried to provide coherence and unity to the Academy through the design and selection of each item. The Air Force called it "Equipment Engineering." WDTA designers were both interior designers and equipment engineers. First of all, as interior designers they chose

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[98] "Walter Dorwin Teague Associates Fifty Years," *Contract Interiors* (June 1977): 110-13.

[99] Sheri Olson, "A Comprehensive Design Vision," in *Modernism at Mid-Century*, 143.

[100] "Furnishing For Fifty Years," *Industrial Design* (April 1958): 28-9.

or designed furnishings and selected colors, fabrics, and floor-coverings–much as if the job were one of decorating on a grand scale. The necessity for specifying items in the tens of thousands determined their other role as equipment engineers.

The essential part of this task was the 13-digit IBM code with which designers were able to codify every item they were dealing with (fig. 3.45). In the code, the last seven digits provide complete identification of every piece of equipment and all its infinite variations, including frame material, special designation, upholstery and color. The code was a symbol of what equipment engineering meant; digitized design of every object.[101] In the project, computation of the design was vividly seen as an active response to the architectural challenge. The IBM code was critical to satisfying the requirements of the Air Force and SOM.

WDTA (with SOM) also used a color code to establish the character of an area and create uniformity. Thus, variety was created in those everyday items reproduced multiple times. The essence of WDTA's approach could be summarized as versatility through standardization. Standardized variations of a basic chair, for instance, fitted it for use in areas of widely differing function and character.[102] Netsch commented on the use

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[101] Ibid, 30.

[102] Ibid, 36.

of color. Concerning the cadet rooms, he emphasized providing flexibility in the uniform space. The use of color for the blankets would vary with each class: red for seniors, electric blue for juniors, golden yellow for sophomores and dark blue for freshmen. He insisted that cadets might have "some variety within a regimented military space where all the quarters were masculine; and you could pick up accents through the special arrangements of the standardized furniture or through accent colors."[103] Is it possible to argue that those colors were really symbols of variety? Each color functioned exactly as if it were an electrical signal, allowing designers to easily arrange their items and helping the cadets to adjust to the circumstance they were facing. The variety, in fact, directly led to control and discipline with which the organization is maintained.

There was extra effort made to maintain the attention of the cadets in the classrooms. "Windowless classrooms, arranged in clusters for flexibility, were deliberately designed to focus attention, blackboard-lined for daily cadet routine."[104] All the classrooms were similar to each other, if not identical. Netsch recalled that "We set up interior classrooms to offer a closed and concentrated experience while the cadet was in it, because for the kind of instruction at the academy little is learned by gazing on the

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[103] Walter Netsch, "A Conversation about the U.S. Air Force Academy between Walter Netsch and John Burchard," in *Modernism at Mid-Century*, 182.

[104] "U.S. Air Force Academy," *Architectural Record* (June 1959): 155.

mountains and you had better concentrate on the blackboard."[105] There were no windows, just walls of blackboard (fig. 3.46) (fig. 3.47). Again, the ceiling and the floor shared the same grid pattern which was the setting for the hidden codes of chairs, tables and other equipment. WDTA successfully completed its task at the Air Force Academy. Reviewing WDTA's activities, *Industrial Design* summarized the significance of the project.

> Aside from the general excitement created by the Academy, the Teague [WDTA] assignment has a special significance for designers. In an age of corporate 'bigness,' designers may increasingly be faced with similar problems of large-scale, or 'organizational' design. Solutions may be as numerous as the design offices which enter this field, but Teague's approach – decentralization, delegating authority, detailed tabulation (based on a central system of standardization) – may be a guide.[106]

Systematization of design and furnishing helped the industrial design firm organize their processes more effectively. However, the same evaluation can be applied to SOM. Dealing with one of the largest commissions in modern history, the two firms developed an efficient system of practice, which later became common in architecture and industrial design. The guide has been accepted and developed by many corporate design firms.

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[105] Walter Netsch, "A Conversation," 181.

[106] Ibid, 37.

These skills are no longer a hidden secret, but are now entirely revealed and have become basics in the design business. On the slope of the Rampart Range of the Rocky Mountains, the business-minded military leaders decided to build the Air Force Academy in which they also hoped to exemplify a new way of organizing the military. SOM and WDTA took charge of almost all designs including selecting the required items at the Academy. Their collaboration and the final result symbolize architecture and design in the age of the military-industrial complex.

Behind the Glass Wall: Foreign Operations

While working on the $133 million Air Force Academy project, SOM also worked on various architecturally prominent projects for corporate clients. They were the Inland Steel Company building (1958), which Mies called “the best building in Chicago,” and the Connecticut General Life Insurance Company headquarters (1957). The San Francisco office also erected the Crown Zellerbach building (1959).[107] All of these buildings greatly contributed to the enhancement of SOM’s position as the leading firm in modern architecture. To American society, SOM was represented by advanced glass and metal structures. While this association was carefully constructed by the firm, some large

[107] “Designers for a Busy World: Mood for Working,” *Newsweek*, May 4, 1959: 98.

scale projects avoided public attention, in particular, some of the firm's foreign projects.

Furthermore, SOM's foreign activities were much larger in scale and more complex in program. SOM's capacity to complete such projects skillfully came from its experiences at Oak Ridge, where the partners of the firm were "willing and able to handle jobs no one then expected an architect to manage, including site surveying and master planning as well as design."[108] As in Oak Ridge, SOM worked as an architecture-engineering firm covering site survey, master planning, various building designs and construction supervision. SOM's wartime experience helped the firm successfully win and manage projects in foreign countries.

In 1946, SOM worked for the Creole Petroleum Corporation, a branch of the Standard Oil Company, constructing refineries in Venezuela. With the rising pressure for sufficient oil supply, oil companies expanded their production. The construction of a new town complex for the refineries was part of the efforts to relieve the pressure of the world oil and gasoline shortage. The Creole project was considered the largest single building program for Standard Oil up to that time, estimated to cost around $120 million in 1946. The program was to build an industrial town for 10,000 people. Like Oak Ridge during the war, SOM designed the whole town including housing, a community center, schools,

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[108] "The Architects from 'Skid's Row,'" *Fortune*, January 1958: 140.

hospitals, clubs and other facilities necessary for normal town living.[109] SOM had a similar project in the same time period for a company named Standard Vacuum Oil jointly owned by Standard Oil of New Jersey and Mobil. For this company, SOM designed housing, schools, hospitals, offices and other facilities for refineries in Sumatra, Indonesia.[110]

SOM's military commissions were even larger than the project in Venezuela. The firm SOM worked with the Corps of Engineers on the Far East Command's Construction program as the architect-engineer. The firm set up a Tokyo Office in 1950, a sub-office of the San Francisco Office, and moved to Okinawa in 1953. SOM worked as part of the Okinawa Engineer District for the construction of a permanent military base on the island.[111] Walter Simmons reported for the *Chicago Daily Tribune* in 1952 that Okinawa was "being groomed as America's forward atomic base in the Pacific" and about $300 million had been budgeted for the project.[112] SOM did site analysis of vast

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[109] *Permanent Housing Project: Creole Petroleum Corporation, Amuay Bay, Venezuela, S.A.* New York, 1946. The architect-engineer for this project was Skidmore, Owings & Merrill–Philip Ives.

[110] William Hartmann, *Oral History of William Hartmann*, Interviewed by Betty Blum (The Art Institute of Chicago, 2003), 86-89.

[111] Owings, *The Spaces In Between*, 128-34. For his book, Owings collected letters and newspaper clippings about the Okinawa project. See Box 51. "Speeches & Writings File," Box 8, The Nathaniel Alexander Owings Papers, Library of Congress.

[112] Walter Simmons, "Finds Okinawa Being Groomed as A-bomb Base," *Chicago Daily Tribune*, March 29, 1952, A5.

areas on the island, developed master plans, and planned various facilities, dormitories and houses for a town. The project was to build all the necessary buildings, power plants, highways and airfields for the large scale military operations in the Pacific. The base was to serve as an "overall Far East Headquarters" for the United States.[113] The temporary SOM Okinawa office headed by John O. Merrill hired 250 Americans, 150 Filipinos, 250 Japanese, and 150 Okinawans in 1953.[114] At one moment, the Okinawa office was one of the largest jobsite staff organized by SOM.[115]

The firm also worked on the construction of "five huge air bases" for the U.S. Air Force in the French Protectorate of Morocco. The air bases were part of the Air Force's strategic plan to increase their presence in the area. To execute the mission of designing and constructing five air fields and related facilities, SOM organized a joint venture with Owings's former Civil Engineering professor at Cornell University, who Owings called 'Professor Urquhart.' Working with the Army Corps of Engineers, the newly organized Porter-Urquhart, Skidmore, Owings & Merrill (PUSOM) completed all missions successfully.[116]

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[113] Walter Simmons, "Okinawa Ready For Use As Far East HDQ. Base," *Chicago Daily Tribune*, September 15, 1953, 13.

[114] *SOM News* 1, August 15, 1953.

[115] *SOM News* 4, February 15, 1954.

After the Second World War, SOM worked with the military and many corporations in designing towns, bases and buildings in foreign countries. In many of those foreign operations, the firm played more complex and extensive roles abroad than it did at home. SOM's success came from its capacity to undertake some of the most urgent and complex projects in an efficient and timely manner, allowing SOM to be deeply trusted by the military and corporations. The firm was, simply put, an essential part of *Pax Americana*. Ironically, SOM presented itself as a firm of modern architecture largely emphasizing the formal aspects of its work. Architectural communities and the general public scarcely knew the firm's extensive operations on foreign soils. While constructing some of the finest examples of sleek, glass and metal office buildings in urban and suburban areas in the United States in the 1950s, SOM was building towns with master planning, site analysis, building projects, roads, water and sewage systems and power plants in foreign countries. SOM's operations went far beyond any traditional definition of architecture.

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[116] Owings, *The Spaces in Between*, 125-35. For PUSOM's activities, refer to Porter-Urquhart Skidmore Owings & Merrill Associated, *Design Analysis, Nouasseur Air Base, French Morocco*, 1953, and Porter-Urquhart Skidmore Owings & Merrill Associated, *Design Analysis, Proposed Airbase, Boulhaut, French, Morocco*, 1952.

CHAPTER 4

Constructing Corporate Architecture: Hitchcock, Wright, Giedion and SOM

But the real problems in the interpretation of modern architecture that concern us most are really the problems related to the definition of what constitutes the best present-day practice. These problems tangle themselves in aesthetics and sociology and the fact that we are well into a period in which the greater part of architectural production is destined to be bureaucratic and anonymous make many students reject a priori the lessons that remain to be learned from the great individual architects who have already made their mark in the twentieth century and who are, some of them, teachers in our schools. There seems to be a dilemma about articulate architects, notoriously in the cases of Le Corbusier and Wright. A very different doctrine emerges from the study of their executed buildings and projects than from a careful reading of their prolific written exhortations. Architectural students, themselves, perhaps automatically divide between those who are most influenced and educated by what they see and those who, either in their courses or in their general reading, are more influenced by what they hear and read. Both types tend to become connoisseurs of architecture, either in graphic documents or in written opinions, and both need, for such things as the sense of scale and a feeling for materials as distinguished from an intellectual grasp of their use, frequent contact with real buildings. That contact should not be restricted to the hypothetical masterpieces of the present, however justifiable it may be to concentrate in the further past upon a few masterpieces, but it certainly should not ignore the work of those who have been considered the twentieth century masters.

— Henry-Russell Hitchcock, “Some Problems in the Interpretation of Modern Architecture," 1942

The American discourse on modern architecture changed dramatically after 1950 with the rise of corporate firms like SOM. The label "corporate modernism" emerged soon thereafter, partially in response to these changes, although it is unclear who used it first. The term suggests that the architectural icons of an 'aberrant' modernism are subservient to American corporate clients and, therefore, superficial in initial design concepts and their formal resolution.[1] Combining the two words, architectural critics and historians sharply differentiated one from the other, good from bad, pure from impure, utopian from dystopian.

The term is clearly a critique of mid-twentieth-century American capitalism which seemed to dominate the cultural world at that time. The judgment was clear from the start: corporate modernism was a corruption of Europe's true and real modernism that had consciously resisted these forces. Large architectural firms, such as SOM, were demonized as exemplars of this perfidious change. However, for us to comprehend the complex changes that did indeed recast modern American architecture in the mid-

[1] Catherine Lynn suggests that Gordon Bunshaft's work combined with architectural idioms of Mies van der Rohe and Le Corbusier was called Corporate Modernism. However, there is no further information on the term. Catherine Lynn, "Saving Corporate Modernism," *Saving Corporate Modernism: Assessing Three Landmarks by Gordon Bunshaft of Skidmore, Owings & Merrill* (New Haven: Yale University School of Architecture, 2001).

twentieth century, it is crucial to examine how American architects and critics of that era tried to understand this phenomenon. Not surprisingly, SOM was often used as the prime example of a transformation that held new possibilities as well as many risks.

Henry-Russell Hitchcock, often considered one of the most influential historians of modern architecture, described and justified the early development of large firms like SOM under the rubric of "The Architecture of Bureaucracy."[2] There are fundamental differences between this term, the architecture of bureaucracy, and what is commonly meant by the later term, "corporate modernism." Nevertheless, Hitchcock's terminology is the most conspicuous qualifier of the former. Beginning with Hitchcock's theory and his interactions with SOM, this chapter illustrates how the idea of corporate architecture emerged and changed during the postwar evolution of modern architecture in the United States and in the world.

There is no doubt that modern architecture became dominant after the war, especially in the United States. This moment coincided with the construction of internal enemies as well as opposing approaches to modern architecture. A common commitment was now divided into opposing camps: genius versus bureaucracy, also known as creative

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[2] Henry-Russell Hitchcock, "Modern Architecture – A Memoir," *Journal of the Society of Architectural Historians* (December 1968): 227-33 and Helen Searing, "Henry-Russell Hitchcock: The Architectural Historian as Critic and Connoisseur," in Elisabeth Blair MacDougall (ed.), *The Architectural Historian in America* (Washington: National Gallery of Art, 1900), 251-63.

versus corporate architecture. While the battle between modern and classical architecture was still fundamental and encompassed the issue of style, this internal battle was limited to methods of production often difficult to discern and a sometimes ambiguous rhetoric of quality against quantity. The intentional separation of the two approaches to modernism ultimately helped the discipline of architecture concentrate on a safe haven of forms instead of engaging in the overwhelming social, cultural, economic and, political changes of the last several decades. However, the identification of "genius," or creative individuals resisting yet operating within an otherwise rational world, created a dangerous state of schizophrenia in architecture. To some extent, we could say that the discipline sought to negate itself in order to keep its identity at an impossibly pure state.

"The Architecture of Bureaucracy and the Architecture of Genius"

Exactly fifteen years after the canonical *International Style* in 1932, Hitchcock published an article in January 1947 in *Architectural Review* entitled, "The Architecture of Bureaucracy & the Architecture of the Genius." While the former focused on formal aspects of modern architecture, the latter dealt with organizational aspects of architecture firms. The author claimed that the emergence of teamwork in building design and planning had combined with quicker, more efficient methods of factory production to generate a “new architecture of bureaucracy.”[3] Embracing modernism was no longer the major problem of architecture in the middle of the twentieth century, wrote Hitchcock; it was that of maintaining quality in the rush of modern design. Architecture’s most important consideration should be the “basic conditions of the times.” In this regard, the vast task of reconstruction after the Second World War was the main cause of the division between the architecture of bureaucracy and the architecture of genius and their respective missions.[4]

In a previously unpublished article, “Industrial Architecture,” Hitchcock insisted that advanced industrial architecture would require the organizational advancement of architectural offices. While discussing Gropius and his work, the Fagus Factory (1911-13), Hitchcock argued that despite the influence of the project, the architect remained an individual architect rather than developing an architectural organization “to cope with all the problems which the continuous designing of large-scale

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[3] Henry-Russell Hitchcock, “The Architecture of Bureaucracy and the Architecture of Genius,” *Architectural Review* (January 1947): 4. Hitchcock reasoned this dichotomy until his later years and applied a different set of criticisms to them.

[4] During the Second World War, Hitchcock expected vast reconstruction of the destroyed cities. He wrote that “the appalling destruction of European cities has the silver lining that it clears the way for drastic urban solutions.” The historian believed what “men in the early twentieth century have dreamed of as possible through architecture, will finally in the next quarter century, come to large scale actualization.” Henry-Russell Hitchcock, “War Influences on Architecture,” Broadcast Over W.G.Y. Schenectady on June 30, 1942. “Lectures” File, Box 24, The Henry-Russell Hitchcock Papers, The Archives of American Art.

industrial projects demand." To Hitchcock, Europe did not have the right condition for industrial architecture. But, America was different.

> But the fullest of industrial architecture required the industrialization of the architectural office itself and that was fully developed perhaps only in America.
> In America, conversely, where the necessary organization of the architectural office was early developed, the contribution of the architect as individual genius was less than abroad… It is inevitable, perhaps, that the group coordination of the large organizations which build American factories should function best in dealing with whole plants where the full range of the many talents grouped under a single head can work out the entire problem with something of the unity which the plant engineers work out the production methods of the industry itself.[5]

Industrialization or rationalization of architectural practice was a necessary condition for advanced industrial architecture. Hitchcock believed the United States was the right place for successful industrial architecture due to its large factories and ability to manage them effectively. Moreover, the influence of individual genius appeared to be much less in the United States than in Europe. He believed that the achievement of the best industrial architecture as in Detroit would be positive. It would be double-sided. On the one side,

[5] Henry-Russell Hitchcock, "Industrial Architecture," 5-6. Box 23, The Henry-Russell Hitchcock Papers. This article appears to be written before the Second World War. The last sentence of the article reads: "The Ford River Rouge plant is a greater contribution to architecture than the Empire State building, and it is but one of the earlier examples of a group of great industrial buildings."

there would be advanced architectural production and organization. This practical side would help architectural firms to tackle growing size and complexity of projects. On the on the other, this new situation would cultivate "the impersonal architectural expression" in architecture.[6]

Hitchcock proposed a similar notion of impersonality in the bureaucracy article of 1947. By defining bureaucratic architecture as "all building that is the product of large-scale architectural organizations, from which personal expression is absent,"[7] Hitchcock simply meant architecture produced by large-scale architectural organizations displaying little personal expression. The term explained how a building was produced. The model of bureaucratic architecture was not government ministries, which Hitchcock saw as rather loosely organized, but the work of an architectural firm such as Albert Kahn, Inc. Such a firm did not depend on an individual genius but on the "organizational genius which can establish a fool-proof system of rapid and complete plan production."[8] While Kahn was seen as an average architect and individual, the Kahn firm appeared as an organizational masterpiece. Hitchcock describes its production process:

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[6] Ibid.

[7] Henry-Russell Hitchcock, "The Architecture of Bureaucracy and the Architecture of Genius," 4.

[8] Ibid.

> The different sets of plans for construction, for wiring, for heating, etc., and even for design, ought to come down the line and meet on the site with as perfect mutual co-ordination as machine parts come from the various sections of a factory to be joined first into sub-assemblies and then into the finished product on the final assembly line.[9]

This highly organized process was necessary for the vast reconstruction of post-Second World War America; one person, whether a genius or not, could not master all the problems involved in such a large project.[10] Thus, the post-war industrial demand in America legitimized the emergence of bureaucratic architecture. As more complex programs and larger projects emerged, Hitchcock contended that the architecture of bureaucracy was a completely natural evolution of modern architecture.

By combining various considerations in a complicated building project as in a well-coordinated machine, "bureaucratic architecture can achieve in experienced hands a high level of amenity." The absence of personal expression in bureaucratic architecture

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[9] Ibid.

[10] Hitchcock prepared several photographs for the article. One of them was a photo of Eero Saarinen's General Motors Research Institute, which was presumably an example of bureaucratic architecture. "I have now photographs of the Wright model of the Guggenheim Museum of Non-Objective Art, the General Motors Research Institute by Eero Saarinen and a wind tunnel connected with the plant where I was working. I am also after photographs of a characteristic wartime plant, Dodge-Chicago, which were promised me by the Kahn office when I was in Detroit, and am attempting to obtain photographs of Oak Ridge, the A-bomb city." The *Architectural Review* ultimately did not include the General Motors Research building and the wind tunnel. Henry-Russell Hitchcock, Letter to Nikolaus Pevsner on October 22, 1946, Box 3, The Henry-Russell Hitchcock Papers.

was regarded as the natural result of its organizational development. Now, the issue of quality in bureaucratic architecture was "to raise housing, schools, and other community facilities to the level of the best new factories," like those designed by the Albert Kahn office.[11]

Hitchcock employed the terms "bureaucrat" and "bureaucratic" without the "pejorative connotation which they have for many people." The term was used only to designate the organizational structure of an architectural office. Likewise, "genius" was intended to define an architect who worked as "a creative individual rather than an anonymous member of a team."[12] Genius merely implied an individual's "psychological approach and way of working at architecture which may or may not produce masterpieces." Bureaucratic architecture was assessed from the sum of its particular amenities compared to similar buildings while the quality of architecture of genius depends on overall impact, thus becoming an "organism not a mechanical assembly of parts."[13] For this reason, Hitchcock did not appraise Frank Lloyd Wright's Solomon R. Guggenheim Museum as a collection of fragmented parts but as a whole, like a work of

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[11] Henry-Russell Hitchcock, "The Architecture of Bureaucracy and the Architecture of Genius," 5-6.

[12] Ibid, 6.

[13] Ibid, 5-6.

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The architecture of genius was an “artistic gamble” that may or may not be pulled off. On the contrary, the architecture of bureaucracy was expected to meet certain expectations and solve enormous practical needs by way of technically and programmatically capable hands. Hitchcock insisted that giving the commission of large-scale practical projects such as factories, schools or housing projects a single architect-genius is undesirable and risky because those projects involve too many technical and practical considerations for a single designer to take care of. In the end, according to Hitchcock, the designer sets up a pseudo-bureaucratic organization, yet it is not possible because the individual is not likely to have either “the taste or the special administrative and executive talent.”[14]

This is not to say that the architecture of genius is no longer necessary. Some buildings by architects of genius are needed in order to balance and relieve “the necessary monotony and the low level of plastic interest of the bureaucratic architecture.”[15] Focal structures such as the theatres, churches, libraries, and municipal buildings, which serve the community as a whole, should be given to the architect of genius and the rest,

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[14] Ibid, 6.

[15] Ibid.

including housing projects, schools, or hospitals, to the bureaucratic architectural organization. Thus, the role of a genius was defined in comparison with the architecture of bureaucracy. Like different types of projects, their architectural criteria should be separate. Hitchcock insisted that conceptually “the two types of work are distinctive and should not be subjected to the same type of analysis and criticism any more than the same type of analysis and criticism should be applied to a Hawksmoor church or Soane art gallery on the one hand to a London square or terrace of their periods on the other.” The two types of practice should be evaluated separately. Hitchcock elaborated further.

> Both sorts of work require technical mastery of the structural means of the day, both require skilful analysis of purpose and mastery of functional planning, both need thorough and consistent designing; but only complex individual structures of generalized symbolic meaning actually fail architecturally when there has been no individual imaginative formulation. While in the eighteenth century terrace of houses or the twentieth century factory too intense an imaginative formulation may actually lead to pretentious absurdity.[16]

In this manner, Hitchcock clearly separated the two types of architectural production, assigning each group different roles to play in the reconstruction of post-Second World

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[16] Ibid.

War cities. The architecture of bureaucracy played an essential role in solving urgent practical problems, combining modern aesthetics with new technology and introducing new modern organizational methods to architecture. There was less consideration for the style and more for "quality in the terms appropriate to the method of architectural production."[17] The emphasis on a few men's contributions gave excessive weight to unique structures such as churches, museums and private houses "in a world actually more largely concerned with extensive projects of rebuilding bombed towns, large and small, with re-housing rapidly a high proportion of national populations and, now in America, with innumerable programs of renewal of the cores of existing cities."[18] The architect of genius lacks the capability of undertaking the speedy construction of complex practical and technical buildings. The question of style in the 1932 *International Style* exhibition was now replaced by the economic, political, and technological necessity of the rising corporate world.

This does not mean that Hitchcock drastically altered his position from the formalism exhibited in the *International Style* book to a more inclusive stance. Even in 1948, the historian argued that "architecture has always been essentially an abstract

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[17] Ibid.

[18] Henry-Russell Hitchcock, "American Architecture in the Early Sixties," *Zodiac* (1962): 9.

art."[19] Now, he wanted to contextualize formalism in a world where modern forms were inevitable and omnipresent. It should be noted that Hitchcock had intentionally avoided any socio-political issues crucial to European modernism in the 1932 catalogue, the most calamitous year of the Great Depression. He continued to avoid social issues, attempting instead to identify and separate the architecture of bureaucracy from the architecture of genius without focusing on whether certain forms were modern or not. Simply put, he focused on how architecture was produced, not how it looked. Firmly taking the position of the architectural historian as a 'connoisseur' of images,[20] Hitchcock noted two kinds of architecture: one produced by a single designer and the other by a group of participants. He tried to preserve the pristine world of genius in which architectural forms still had some hermetic meaning while accepting the accelerating bureaucratization and its mechanical production of architecture by corporate firms. In this sense, the historian's work appeared to be part of the ideology of the Pax-Americana.

For the first time, the historian divided modern architecture into two groups based on their method of production regardless of the quality of their work. Hitchcock's distinction between bureaucracy and genius in architecture had no precedent in

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[19] Henry-Russell Hitchcock, *Painting Toward Architecture* (New York: Sloan and Pearce, 1948), 11.

[20] Searing, "Henry-Russell Hitchcock."

architectural history. However, he most likely drew upon the work of Max Weber. In 1946, a year before the publication of Hitchcock's article, Hans H. Gerth and C. Wright Mills translated and edited a collection of Weber's theories and published them: *From Max Weber: Essays in Sociology*. This book was divided into four sections, "Science and Politics," "Power," "Religion" and "Social Structures." The section on Power included segments about two types of authority: bureaucratic and charismatic.[21]

Weber had originally argued that there are three pure types of legitimate authority in history: traditional, charismatic, and legal rational authority. Traditional authority relies on belief in the sanctity of immemorial tradition and custom. This type is embodied by tribal chiefs, patriarchs, and feudal aristocrats. Charismatic authority rests on devotion to the sanctity, heroism or individual attractiveness of a heroic figure. Revolutionary political leaders, religious prophets or legendary warriors fall under this heading. The third type is legal rational authority based on properly enacted rules. Bureaucratic administrators and government officials can be included in this genre of authority.[22]

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[21] Max Weber, *From Max Weber: Essays in Sociology*, translated and edited by Hans H. Gerth and C. Wright Mills (New York: Oxford University Press, 1946).

[22] Max Weber, *Max Weber: The Theory of Social and Economic Organization*, trans. by A. M. Henderson and Talcott Parsons (New York, Oxford University Press, 1947), 328-29.

The term charisma originally meant ‘the gift of grace,’ wrote Gerth and Mills in the introduction. According to Weber, charismatic leaders are seen by their followers as having some extraordinary power or quality that allows them to be dominant. The leader is blessed with God’s grace or, in other terms, is seen as a genius. Weber’s conception of the charismatic leader is “in continuity with the concept of ‘genius’ as it was applied since the Renaissance to artistic and intellectual leaders.”[23] Because charisma overrules “all rational economic conduct,” charismatic authority is foreign to economic gains.[24] This authority, according to Weber, exists “specifically outside the realm of everyday routine and the profane sphere.”[25] The administrative staff of charismatic leaders is not chosen because of rational qualifications, social status, or family loyalty. They are recruited as followers. Loyalty precludes any set hierarchy or promotion. Regular salaries do not exist because pure charisma is alien to economic calculability.

The most common means of domination in modern societies is the third type of authority, legal rational authority. In this instance, an individual who holds authority dominates using impersonal norms, not the residue of tradition but rationally constructed criteria. When legal rational authority is highly developed, it becomes a bureaucracy. The

[23] Hans H. Gerth and C. Wright Mills, “Introduction,” *From Max Weber*, 52-53.

[24] Max Weber, *From Max Weber: Essays in Sociology*, 247.

[25] Max Weber, *Max Weber: The Theory of Social and Economic Organization*, 361.

staff of an organization operates continuously according to formulas that govern the conduct of their official business. This legal authority is based on rules and coercion within the organization. Those subject to legal rational authority owe no personal loyalty to a superior. They follow his or her commands solely within the restricted sphere of boundaries specified by rules within an organization.

Bureaucracy has little to do with inefficiency. In fact, the opposite is true.

> The decisive reason for the advance of bureaucratic organization has always been its purely technical superiority over any other form of organization. The fully developed bureaucratic mechanism compares with other organizations exactly as does the machine with non-mechanical modes of production.
> Precision, speed, unambiguity, knowledge of the files, continuity, discretion, unity, strict subordination, reduction of friction and of material and personal costs-there are raised to the optimum point in the strictly bureaucratic administration…[26]

The efficiency of a bureaucratic organization in performing a routine everyday task is the main reason for its spread in modern society. This efficiency is a natural result of rationalization. In addition, these qualities are exactly what capitalism needs to keep its system operating successfully. Weber understood rationalization as an unavoidable

[26] Ibid, 214.

process of modernization which forces the entire society to become more bureaucratically organized. Bureaucratization "offers above all the optimum possibility for carrying through the principle of specializing administrative functions according to purely objective consideration."[27]

> Bureaucracy has a 'rational' character: rules, means, ends, and matter-of-factness dominate its bearing. Everywhere its origin and its diffusion have therefore had 'revolutionary' results, in a special sense, which has still to be discussed. This is the same influence which the advance of rationalism in general has had. The march of bureaucracy has destroyed structures of domination which had no rational character, in the special sense of the term.[28]

While bureaucratic authority is a permanent system of administration associated with the routine tasks of everyday life, charismatic authority is temporary and extraordinary. A charismatic individual, one whom followers believe to possess strikingly exceptional capacities, is thought to be of a supernatural kind. Extraordinary qualities should be constantly attributed to the person by others. Pure charisma does not require any legitimacy other than the exceptional qualities of the person in question.

According to Weber, there have been two major revolutionary forces

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[27] Max Weber, *From Max Weber*, 214-15.

[28] Ibid, 244.

throughout history. One is the general tendency of bureaucracy which destroys "structures of domination which had no rational character." The other one is the emergence of charismatic movements which disrupt the established institutions, traditions and forms of rational management. Bureaucracy revolutionizes modern society externally because it creates the condition in which people are forced to live. Charisma, however, results in a revolution internally because it alters people's perceptions of certain issues. History for Weber is an endless struggle between charisma and bureaucratic rationalization although there can be no clear explanation of why a charismatic figure emerges at a certain time.[29] In addition, charisma is not permanent and is inherently unstable. Weber writes:

> Every charisma is on the road from a turbulently emotional life that knows no economic rationality to a slow death by suffocation under the weight of material interests: every hour of its existence brings it nearer to this end.[30]

Charisma is therefore always under the threat of demise in modern society as a result of the surrounding material civilization. While the process of bureaucratization is constant

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[29] Talcott Parsons, "Introduction," in Max Weber, *Max Weber: The Theory of Social and Economic Organization*, 71.

[30] Max Weber, *Economy and Society,* Vol.2 (New York: Bedminster Press, 1968), 1120.

and permanent until it reaches the level of the "iron cage," charisma appears abruptly and loses its force quickly.[31] Facing its looming death, charisma tries to stop its fate by perpetuating its life through bureaucracy. Weber called this the "routinization of charisma." The routinization of charisma occurs when people try to transform a gift of grace into a permanent possession of everyday life, in which process the charisma of an individual does not disappear. Rather it becomes objectified as a quality of the order developing from a charismatic origin, as the charisma of office or of a ruling house.[32]

It is undeniable that there many similarities between Hitchcock's 1947 article, "The Architecture of Bureaucracy and the Architecture of Genius" and the theories of Max Weber, particularly the segment included in *From Max Weber: Essays in Sociology* in 1946. The similarities and differences between the two publications illustrate the impact of sociology on the conceptualization of corporate modernism and its problems. The first similarity is the separation between bureaucracy and genius. Although Weber proposed three types of authority, only two types were introduced in *From Max Weber*. Likewise, Hitchcock employed two types in order to explain two major types of architectural productions in the modern world. The second similarity is the use of the

[31] Max Weber, *The Protestant Ethic and the Spirit of Capitalism*, trans. by Talcott Parsons (New York: Charles Scribner's Sons, 1958), 181.

[32] Talcott Parsons, "Introduction," Max Weber, *Max Weber: The Theory of Social and Economic Organization*, 76.

terms genius and charisma. Weber employed the concept of charisma in a “completely value-neutral sense.”[33] He took the position of a social scientist. As described above, Hitchcock followed precisely the same direction. It is uncommon for an architectural historian to employ the terms bureaucracy and genius without a sense of value.

Genius and the Mob

Two years later Frank Lloyd Wright published *Genius and the Mobocracy*, a biography of Louis Sullivan combined with an autobiography of the author’s earlier years with Sullivan.[34] The book can be interpreted as a direct response to Hitchcock’s 1947 article. While Hitchcock saw the rise of large bureaucratic architecture firms as a necessary development of architectural production, Wright illuminated the importance of the genius and lamented over the pitiful situation that creative leaders had to encounter. He was condemning the modern bureaucratic firm, holding this kind of architecture to blame for a degraded twin in American modern society.

Wright and Hitchcock had an intense and somewhat contentious professional and personal relationship. The historian and the architect began to acknowledge each

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[33] Max Weber, *From Max Weber*, 245.

[34] Frank Lloyd Wright, *Genius and Mobocracy* (New York: Horizon Press, 1971), 166. Originally published in 1949 by the Frank Lloyd Foundation.

other from the late 1920s until the early 1930s.[35] In 1942, Hitchcock published a book, *In the Nature of Materials: The Buildings of Frank Lloyd Wright, 1887-1941*. This biography of the architect began with the catalogue from the exhibition of Frank Lloyd Wright's architecture at the Museum of Modern Art in New York in 1940, which Hitchcock called "the most important architectural exhibition" since the international exhibition of Modern Architecture of 1932.[36] Hitchcock closely collaborated with Wright for both the exhibition and the book.[37] He dedicated the book to Wesleyan University, which became known as the "first American institution to recognize the genius of Frank Lloyd Wright with academic honors."[38] However, relations between Hitchcock and Wright were not always congenial. In fact, the historian and the architect had a long history of hostility towards one another. This was in part due to the fact that Hitchcock held a radically different view on Wright's role in modern architecture from that of the architect himself.

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[35] Wright was well aware of Hitchcock's work at least from the 1930s on. For the early relationship between Hitchcock and Wright, refer to Donald Leslie Johnson, *Frank Lloyd Wright versus America: The 1930s* (Cambridge, MA and London: MIT Press, 1990), 28-38.

[36] Henry-Russell Hitchcock, "Frank Lloyd Wright at the Museum of Modern Art," *The Art Bulletin* 23, No.1 (March 1941): 73.

[37] Henry-Russell Hitchcock, *In the Nature of Materials: The Buildings of Frank Lloyd Wright, 1887-1941* (New York: Da Capo, 1942), xxviii. Hitchcock wrote, "I have had throughout very complete cooperation from Wright and the members of the Taliesin Fellowship."

[38] Ibid.

Hitchcock's stance on Wright was made clear as early as 1932. Hitchcock introduced two fronts of modern architecture in the catalogue for the International Style exhibition: artistic and technical. In writing about Le Corbusier's Villa Savoye at Poissy, Hitchcock hinted at how he would eventually evaluate modern architecture.

> It is inevitable in the discussion of such a house to emphasize the aesthetic side of modern architecture. But the adjustment of the plan and the adaption of the structure are no less masterly. It is moreover imbued with a personal spirit as Wright's best work always has been. Much of modern building, particularly in the field of housing, must be impersonal to the extent of anonymity. But modern architecture has also a place for individuality and a genius which is primarily artistic.[39]

In this comment, Hitchcock illuminated his belief that modern architecture was technical as well as artistic at the same time. While Le Corbusier was believed to possess both attributes, Wright was understood mainly through artistic exploration.

One could argue that Hitchcock had already been exposed to Weber's theory.

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[39] Henry-Russell Hitchcock, "Le Corbusier," Alfred H. Barr and et al. *Modern Architects* (New York: Museum of Modern Art, 1932), 77. There has been confusion about names of the catalogue and the exhibition. The exhibition and catalogue had the same name, Modern Architecture – International Exhibition. This catalogue (Museum of Modern Art) written by Henry-Russell Hitchcock, Philip Johnson and Lewis Mumford was published with another title, *Modern Architects* (Museum of Modern Art and W.W. Norton). Hitchcock and Johnson published another book, *The International Style: Architecture Since 1922* (New York: W.W. Norton, 1932). This book has been taken to be the catalogue of the Modern architecture exhibition. Terence Riley, *The International Exhibition 15 and the Museum of Modern Art* (New York: Rizzoli, 1992), 201.

Regardless, there is no doubt that the historian characterized Wright as not entirely modern. He was pictured as a historical figure, losing his legitimacy in the modern world. Hitchcock made it clear that Wright's role would be limited due to the emergence of a new modernity.

> But, now conditions are changed. No young architect anywhere grows up in quite the isolation of Wright's youth. American architecture need not develop entirely in the footsteps of her great individual genius. A larger and a newer world calls. The day of the lone pioneer is past, the advance may be on a more general front at last. Throughout the world there are others beside Wright to lead the way toward the future.[40]

As a result of the new historical condition, "the day of the lone pioneer" was obsolete. A more general pattern of innovation and change would be advanced, not by a single individual, but by diverse groups. Hitchcock's argument on who should lead modern architecture was known to the master. Wright expressed deep contempt for Hitchcock and his lack of understanding of architecture. The quote below shows the early relationship between the two before it was mollified by Hitchcock's publication of *In the Nature of Materials: The Buildings of Frank Lloyd Wright, 1887-1941*. In a letter in 1937, Wright

[40] Hitchcock, "Frank Lloyd Wright," Alfred H. Barr and et al. *Modern Architects*, 37.

berated Hitchcock for his ignorance and arbitrariness: “Your knowledge is so superficial, related only to some predilection you have for certain effects which please you, which makes them right, and certain effects which displease you, which makes them wrong.” To Wright, Hitchcock appeared to be a young man who pursued fame with little knowledge of architecture. Wright asked about the real identity and intention of the historian.

> Did he happen or did he grow – what does he know? Is he the usual guesser writing to be noticed – right or wrong – or is he a sincere student of his subject prematurely sharing his personal and inquisitive impressions (in a man of your type they would be “convictions”) with all and sundry.
> I have been amazed at the continual effrontery of your dicta when I see so plainly the serene negation, and recognize the depths of ignorance beneath it – of all I have myself learned of architecture except certain effects proceeding from my own work which you have observed in the works of Le Corbusier, Ludwig Mies, Oud and some others.[41]

Wright sarcastically suggested Hitchcock should become his apprentice at Taliesin for a year to develop a true understanding of architecture. Apparently, Hitchcock appeared to be an obstacle to creativity and organic architecture: “Our movement in the direction of

[41] Frank Lloyd Wright, Letter to Henry-Russell Hitchcock, “Correspondence, 1937,” Box 1, The Henry-Russell Hitchcock Papers. The letter dated September 15th, 1937. In the same letter, Wright added that, “We have met, you and I, and I have recognized a certain dogmatic Presbyterian force of character and personality in you which might serve a good purpose if it went right and do harm if it went wrong.” In the beginning of the 1940s, their relationship became much less hostile.

an organic architecture has suffered a terrible set back [sic] from the exploitations of the left wing of which you are a camp follower."[42] Considering Wright believed his organic architecture was essential to building democracy and democratic freedom, Hitchcock was unmistakably understood as an opponent of American virtues.[43]

Wright differed from Hitchcock on many issues. Nevertheless, the architect did not question the legitimacy of the separation between genius and bureaucracy. On the contrary, he fully accepted the separation and positioned himself with Sullivan as a genius who suffered from the dictatorship of the mob.

> In what we call production and success there is no longer the spirit of youth because there is no firm platform nor any springboard at all for truly creative imagination. In this civilization, premature by way of science and sudden riches – probably proceeding from barbarism to degeneracy with stunning waste of power – genius is a sin against mob![44]

The genius was losing his or her leadership in a rationalized society. According to Weber,

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[42] Ibid.

[43] Wright made many comments similar to the one regarding left wing European architects. One of them reads: "These Bauhaus architects ran from political totalitarianism in Germany to what is now made by specious promotion to seem their own totalitarianism in art here in America." Frank Lloyd Wright, "Frank Lloyd Wright Speaks Up," *Architecture in America: A Battle of Styles*, eds. William A. Coles and Henry Hope Reed, Jr. (New York: Appleton-Century-Crofts, 1961), 351. The original article was published in *House Beautiful*, XCV (July, 1953).

[44] Wright, *Genius and Mobocracy*, 106

this occurrence was a natural process of rationalization, but Wright thought it was a deplorable degradation of the world. He contended that a genius is a “man who has an eye to see nature. A genius is a man with a heart to feel nature. And a genius is a man with a boldness to follow nature.” The genius is higher than an ordinary person as were Sullivan and Wright himself. It is no wonder that, with the material and technological development of American society, Wright protested what seemed to be the lack of leadership. He maintained that “we’re living in a field in a time when great advantages – magnificent advantages – all becoming disadvantages for the lack of the prophetic genius who can see in the nature of the thing, analyze it, and make it beneficial.”[45]

And yet, even arguing the importance of genius in the world where the mob controls everything, Wright too separated bureaucracy and genius in architecture. Hitchcock attempted to justify the emergence of a new method of architectural production; however, Wright did not see any good reason for the existence of the architecture of bureaucracy. To him, it was just the control of the mob without any cause or justice. It was a mindless revolt against leadership. Not surprisingly, especially with such an extreme contrast, Wright opposed the control of the mob and naturally proposed

[45] Frank Lloyd Wright, “Frank Lloyd Wright with the Student Architect of the University of California-Berkeley,” in *The Master Architect: Conversations with Frank Lloyd Wright*, ed. Patrick J. Meehan (John Wiley and Sons, New York: 1984), 188. The University of California-Berkeley event was in April 1957.

elitism:

> As my work went on, gradually, I saw more clearly the spiritual implications of plasticity where space was a quality to be realized in building construction. I learned the stimulating values of its implication wherever the life of the free individual might be served by the building. Of course, such objective outward expression of subjective inner life can only survive in the freedom of genuine democracy; the highest form of aristocracy ever seen – that of the innate aristocrat, aristocracy not hereditary but of the man himself – as himself.[46]

As if paraphrasing Weber, this aristocracy relies on an extraordinary individual or a charismatic leader with a higher spiritual mind.[47] The aristocrat does not know or need any legitimacy simply because his mission does not come from rational considerations.

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46 Wright, *Genius and Mobocracy,* 81.

47 Thomas Jefferson had previously proposed the idea of natural aristocracy. He compared natural aristocracy to artificial aristocracy. There are clear similarities between Jefferson's two aristocracies and Wright's genius and mobocracy. Jefferson's focus was not the lamentable situation of the leaders but the importance of not being dominated by the privileged without talent. "For I agree with you that there is a natural aristocracy among men. The grounds of this are virtue and talents. Formerly bodily powers gave place among the aristoi. But since the invention of gunpowder has armed the weak as well as the strong with missile death, bodily strength, like beauty, good humor, politeness and other accomplishments, has become but an auxiliary ground of distinction. There is also an artificial aristocracy founded on wealth and birth, without either virtue or talents; for with these it would belong to the first class. The natural aristocracy I consider as the most precious gift of nature for the instruction, the trusts, and government of society. And indeed it would have been inconsistent in creation to have formed man for the social state, and not to have provided virtue and wisdom enough to manage the concerns of the society. May we not even say that that form of government is the best which provides the most effectually for a pure selection of these natural aristoi into the offices of government? The artificial aristocracy is a mischievous ingredient in government, and provision should be made to prevent it's ascendancy." Thomas Jefferson, *The Adams-Jefferson Letters: The Complete Correspondence Between Thomas Jefferson and Abigail and John Adams*, ed. Lester J. Cappon (Chapel Hill, NC: The University of North Carolina Press, 1959), 388.

He is a genius with a "gift of grace," who exists beyond the current status of the professional organization. It seems natural that Wright argued "professionalism is parasitic – a body of men unable to do more than band together to protect themselves."[48] To him, professional societies such as the American Institute of Architects were organizations of incapable people whose mission was to pursue their own secular goals. They refused to accept the leadership of the genius, pursuing only their monetary and political interests.

Wright went beyond criticizing those professionals. He saw the very economic system the cause.

> Of course, this sinister economic "system" (ours) in which without foundation we have at last so completely invested our future – and that of the world at Bretton Woods – *is* better served that way. Mobocracy *does* thrive thus and the economic unit, the buyer, is already so far conditioned in the direction of quantity instead of quality that the merchant's real profit lies in this oblique direction, and who in this attempted civilization (so tempted) is not a merchant?[49]

With the money economy controlling all possible boundaries of life, there appeared little

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[48] Wright, *Genius and Mobocracy*, 18.

[49] Wright, *Genius and Mobocracy*, 29.

room for genius. The victory of quantity over quality is another way of describing the situation of the genius against the mob.

A half century of intellectuals had tried to make sense of this fundamental societal shift. In fact, this sentiment had been common amongst many intellectuals at the turn of the century. Georg Simmel, for example, wrote in “The Metropolis and Mental Life (1903)” that “they [things] all float with the same specific gravity in the constantly moving stream of money. They all rest on the same level and are distinguished only by their amounts.”[50] However, Wright believed there was a chance of redemption. When arguing that “at least so long as we are not yet committed to the mobocrat’s idea of ‘the common man’ there is hope.”[51] Wright believed the last chance of redemption was in the hands of the genius. While Wright did not see anything beyond the mob in SOM, some historians found multiple meanings and contributions from the bureaucratic firm.

“The Experiment of S.O.M.”

And so the incipient issue of the architecture of bureaucracy resurfaced about ten years after the publication of Hitchcock’s “The Architecture of Bureaucracy and the

[50] Georg Simmel, “The Metropolis and Mental Life (1903),” *Georg Simmel: On Individuality and Social Forms* (The University of Chicago Press: Chicago and London, 1971), 330.

[51] Wright, *Genius and Mobocracy*, 105.

Architecture of Genius." At this moment, SOM would become the epitome of the new, more bureaucratic approach to architecture. In a special issue on the firm of Skidmore, Owings & Merrill, the architecture journal *Bauen und Wohnen* included Sigfried Giedion's article entitled "The Experiment of S.O.M" (fig. 4.1). The firm that Hitchcock described in 1947 as a nascent example of the architecture of bureaucracy now appeared as one of the most important experiments of modern architecture.

Early on in his article, Giedion wrote that great Chicago architects such as William Le Baron Jenney, Holabird and Roche, Burnham and Root, Adler and Sullivan "were not just impersonal titles of firms, but highly individual architects and engineers."[52] Here, Giedion echoed Hitchcock's dichotomy of organizations versus creative individuals. Whereas Hitchcock found the legitimacy of the architecture of bureaucracy in the historical demands of the post-Second World War reconstruction and in the complexity of architectural programs, Giedion turned to the end of the nineteenth century with its sudden increase of relatively large-scale architectural projects in New York and Chicago. Giedion maintained that "with the increasing complexities of the profession, large architecture factories began to crop up in New York, with hundreds of employees." The individual designers of Chicago architecture were forgotten "by the

[52] Sigfried Giedion, "The Experiment of S.O.M." *Bauen und Wohnen* 12 (April 1957): 113.

darkness of Wall Street." The primary cause of corporatization of architectural firms in the end of the nineteenth century, argued Giedion, was "commercialism without conscience."[53] Architecture factories abused the architectural forms that had been collected and classified during the nineteenth-century. Creative individuals were crushed by large firms which were solely motivated by the commercialism of the period.

It is clear that Giedion understood Hitchcock's distinction between the large architectural firm and the individual architect. When discussing large architectural firms after the Second World War, both Hitchcock and Giedion saw that the issue of style was obsolete. The main focus became whether a building was designed and constructed by a group or a creative individual; the key element to this focus was organization.

However, Giedion did not portray SOM as one of the "architecture factories." On the contrary, he praised the firm as the key to a new era of architecture. He called it an "experiment on a grand scale." The challenge facing the firm, according to Giedion, was how to fulfill the potential of contemporary architecture without being swayed by the business interests of the client. Giedion admitted that it would be a tough task for the firm of nine hundred employees.[54] SOM partially overcame the factory production of

[53] Ibid.

[54] Ibid, 113-14.

architecture by subdividing its personnel into small groups. In doing so, individual design and large-scale planning could coexist within the organization. The historian saw that "the potentialities of different individuals and regional characteristics are respected and immediately invisible in the result."[55] The organizational structure of SOM allowed an individual designer to better exert his or her potential in design (fig. 4.2). Working in this organizational structure, Walter Netsch, who was only about thirty-five years old, won the competition for the Air Force Academy project and completed the design of the general plan and individual buildings.[56]

It is also interesting that Giedion, who blamed "commercialism without conscience" for the emergence of the architecture factories, did not mention the corporate clients of post-war American capitalism as if the corporate client of the mid-twentieth century was more enlightened than those of the late nineteenth-century. Giedion accordingly sensed in the corporate firm a "healthy and alive atmosphere, which was "the result of the careful selection of the designers, some of which have been selected even as students from among the most talented in the architectural schools." After observing a room in which young architects were discussing the design of the Inland Steel Company

[55] Ibid, 114.

[56] Ibid.

building, Giedion admitted that the atmosphere in the room recalled a description by Frank Lloyd Wright in *Genius and the Mobocracy*.[57] Whereas Hitchcock distinguished two types of architectural practice, Giedion saw a more important role for an organization like SOM to play in contemporary architecture. “Can it forge ahead into the unexplored as did those of the previous generation – Le Corbusier, Gropius, Aalto, Mies?” he asked. After the great masters lost their leadership, the corporate architecture firm became a potential candidate for the leading role in architecture. The success of SOM’s experiment in balancing the requirements of the client and the fulfillment of contemporary architecture “depends on whether teamwork can supplant the force of individual genius. We are still far from the kind of teamwork that built Chartres Cathedral.”[58] Giedion was aware of the intrinsic risk of the experiment. That risk is, put simply, how well such a large firm could hold business interests in the background so they did not interfere with architectural solutions. He added that this issue was not merely a question that concerned the experiment of SOM, but it was a “question that affects the fate of our whole period.”[59] SOM could be successful if it restrained its monetary gains and pursued architectural solutions first.

[57] Ibid.

[58] Ibid.

[59] Ibid.

Was it possible for a bureaucratic organization like SOM to not give priority to its business interests? Giedion knew that the complex organizational structure of the firm was essential to its success in the post-war period. In the organization chart of SOM Chicago, for example, architectural design appears much less important than in a conventional architecture firm. How, then, could one possibly give priority to architectural solutions over business interests when they are in conflict with one another? In Giedion's assessment, "the fate of our whole period" was doomed to fail.

SOM, or Architecture of Organization

Giedion recognized SOM as a new type of architectural organization that combined the creative forces of individual architects with the strength of a large-scale firm. This observation was foreseen by the Museum of Modern Art (MoMA) when it invited the firm to exhibit its recent projects in 1950 (fig. 4.3). The bulletin for the exhibition reported that it was the first architecture show that did not focus on individual designers or collaborating partners. It was a firm "composed of a group of single designers working exclusively in the modern idiom, [that] produces imaginative, serviceable and sophisticated architecture."[60] The museum observed SOM to be a group that produced

[60] Ibid.

architecture that was creative, practical and technically advanced. The bulletin continues:

> The single designers who function within this organization have no fear of a loss of individuality. They are able to work within their corporate framework because they understand and employ the vocabulary and grammar which developed from the esthetic conceptions of the twenties. They work together animated by two disciplines which they all share – the discipline of modern architecture and the discipline of American organizational methods.[61]

The architects of the organization understood their new situation. Due to the size of projects and personnel involved, they could no longer work as individuals. Indeed, they were willing to work together collectively. They could communicate comfortably with one another by employing the same visual language. The museum recognized SOM as an excellent combination of modern architecture and American organizational methods.

Giedion's characterization of the young architects at the SOM Chicago office came from this exhibition at MoMA. This aspect of SOM indeed enabled the designers to contend with seasoned, well-established individual architects in the competitive yet dynamic market after the Second World War. Young designers seem to prefer to be part of an organization that had already achieved a complicated network among various experts

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[61] "Skidmore, Owings & Merrill," *Museum of Modern Art Bulletin* XVIII, No. 1 (Fall 1950): 5.

and specialists related to the design and construction of large-scale projects.[62] They knew that by working together they could achieve much more. William Hartman, a partner at the SOM Chicago office, portrayed the process of corporatization of the firm.

> The more complex a project, the more varied skills have to be brought to bear. There was not the luxury of being in your own cell and doing a design alone. This led to what I believed should be the framework for a SOM… there is room for a firm like ours that would be an assembly of the finest talents in every discipline naturally, architectural design and all those skills which lead to architecture and design. But, coming right along in parallel, structural design and mechanical, electrical, and plumbing design coming right behind that and a part of it. And interiors. And because buildings fit in some kind of an environment setting, planning and landscape architecture, for sure. And we did resolve to establish that type of organization. With emphasis on quality of talents.[63]

SOM grew out of the increasing size and complexity of architectural and engineering projects. Hartmann suggested that it was necessary to create an organizational structure to manage such large-scale projects. Bringing in professionals with various backgrounds and incorporating them into parts of a large corporate structure was what made SOM

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[62] For the general changes of the culture in this period, see William H. Whyte, *The Organization Man* (New York: Simon and Schuster, 1956). Particularly, Part 1 and 2.

[63] William Hartmann, *Oral History of William Hartmann*, Interviewed by Betty Blum (The Art Institute of Chicago, 2003), 80.

successful. Moreover, SOM attempted to find energetic and capable young talents.

Choosing modern design as the sole communicable language, SOM designers developed only modern style buildings. There was total agreement that their main concern was how to execute it effectively and affordably. They also had to cope with the change in the business of architecture from the simple design of buildings to more inclusive architecture-engineering projects. Organizing several hundred or sometimes a thousand employees in a efficient way was a new and different task. The lessons of American organizational methods were what led to SOM's success in the discipline of modern architecture.

The American Institute of Architects (AIA) New York Chapter recognized this ingenious combination of modern architecture and business techniques, awarding Skidmore the Medal of Honor in March 1949. By then, SOM had built the Great Lake Naval Training Center, the Sloan-Kettering Institute, the Bellevue-New York University Hospital Research Group, the Town of Oak Ridge, Tennessee, and the Terrace Plaza Hotel in Cincinnati. Skidmore had also established one of the most successful architecture-engineering firms in the nation (fig. 4.4) (fig. 4.5) (fig. 4.6). But, the award was not given to Skidmore because of the quality of his work. As one of the founding fathers of the firm, he received the award because of the firm's new approach to client and program. Skidmore proved how "to understand the practical problems of the client, to solve these problems in an economic and socially useful manner, and to produce from this distinguished architecture."[64]

The combination of a modern architectural idiom and bureaucratic organizational techniques was deeply embedded in the birth and early development of SOM. When the brothers-in-law, Skidmore and Owings, set up their firm in 1936 in Chicago, the formation was very simple; there were two collaborating partners and several employees. However, it suddenly changed when the architect and engineer John O. Merrill was invited to be a partner in 1939. Although the name of the firm changed from Skidmore and Owings to Skidmore, Owings & Merrill, Merrill remained a limited partner for the following ten years. In 1949, the firm gave up the dual partnership, accepting Merrill, William S. Brown, Gordon Bunshaft, Robert W. Cutler, and J. Walter Severinghaus as full partners. After that, the firm occasionally accepted full partners with unanimity. The modern partnership structure in the firm had finally come to fruition (fig. 4.7) (fig. 4.8).

This expansion of leadership was influenced by the founders' desire to keep the firm intact and flexible when they retired. They considered the organization's well-being

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[64] The Louis Skidmore Papers, Library of Congress.

much more important than themselves. *Fortune* magazine noted that the formula used to broaden the base of the original two-man partnership was a “variation of one widely used by law firms, but rare if not unique in architecture."[65] Indeed, the leadership structure was initially drafted and continuously rewritten by Marshall Grosscup Sampsell, a lawyer who started working with the firm beginning in 1936. He was a partner of the Chicago law firm of Isham, Lincoln & Beale. Many early partners remembered him as one of the most important figures in the development of SOM (fig. 4.9).[66] To Bunshaft, Sampsell was “the man who’s responsible for the creation of what the firm became.”[67] Sampsell developed the basic structure of partners, associate partners, and participants in order to make the firm a continuously growing organization. Within this structure, young designers could progress up the ladder.[68] Sampsell based this concept on the structure of law firms he knew well.

Hartmann argued that there were three essential people who established the firm: Skidmore, Owings and Sampsell. He emphasized the importance of the lawyer

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[65] “The Architects from ‘Skid’s Row,’” *Fortune*, January 1958: 212.

[66] Box 21, The Nathaniel Alexander Owings Papers, Library of Congress. Sampsell wrote SOM’s early partnership agreements beginning 1939.

[67] Gordon Bunshaft, *Oral History of Gordon Bunshaft*, Interviewed by Betty J. Blum (The Art Institute of Chicago, 2000), 44.

[68] Ibid, 121.

assuring that, “He was of great importance in how SOM was established. I’m sure it would have fallen apart if he hadn’t existed.”[69] As Bunshaft and Hartmann remember, Sampsell was much more than a lawyer for the firm. He introduced the system of partnership to the firm in 1936 and became the person in charge of maintenance of the rational bureaucratic structure for several decades. To some extent, he was much more important than any single partner, becoming the guiding light in all crucial decision-making processes. Owings recorded this significance:

> Marshall Grosscup Sampsell folds his money flat with a silver clip, and all of the crisp bills held therein are new…
> Grosscup is orderly where I am not, calm where I am not, cautious where I am not. Something like a satellite moon to Saturn, he is essentially a part of SOM, yet detached. Shy, retiring, he has been our legal mind since 1936, serving as confidant and confessor.
> The overall partnership documents under which SOM operates were originally put together by Gross and are ever-changing, like the amorphous body of English law, which includes much that is not written down at all.[70]

Sampsell was both an outsider and an insider. He was a partner at a law firm and decided many critical decisions with partners. In fact, he guided the direction of the firm,

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[69] Hartmann, *Oral History of William Hartmann*, 72.

[70] Nathaniel A. Owings, *The Spaces in Between: An Architect’s Journey* (Boston: Houghton Mifflin Company, 1973), 70.

providing everyday legal and operational advice. Sampsell was the legal mind and at the same time a caring friend to most of SOM partners. He was the hidden anchor of the firm at least three decades starting in 1936. It was no wonder Hartmann brought up Sampsell first when arguing why the Chicago office was a kind of central office to SOM.[71]

As a large firm, SOM developed a system for employees designed to maintain long-term stability. A medical insurance program and a profit-sharing retirement fund were among the benefits that it offered employees. SOM was one of the first firms that introduced an inclusive medical insurance program. In 1953, *SOM Newsletter* reported the introduction of Group Insurance as an important part of the firm's personnel policies. The medical insurance program was made possible through the Connecticut General Insurance Company and the New York Life Insurance Company. Over two hundred employees were eligible.[72] With the guidance of Sampsell, the partners decided to begin a 'Profit-Sharing Retirement Fund' in 1956. SOM is believed to be one of the first professional organizations to establish this type of fund. There were two hundred twenty-two persons eligible that year. "By broadening the base of profit participation, the Fund is one more step in our goal of recognizing the part each person plays in contributing to the

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[71] Hartmann, *Oral History of William Hartmann*, 164.

[72] *SOM News* 2, October 15, 1953.

success of this firm."[73]

When the AIA awarded its gold medal to Skidmore in 1957, the highest honor had previously been given to only fourteen American architects, among whom were Charles F. McKim, Paul P. Cret, Louis Sullivan, Eliel Saarinen, Frank Lloyd Wright and Bernard Maybeck. Skidmore was being recognized among the most prominent architects in the United States. However, his qualifications were vastly different from those of the previous recipients.

> Pioneering new paths in a profession depending hitherto largely upon individual service, you have built an organization with the name of Skidmore, Owings & Merrill in which you have united in singleness of purpose the manifold skills, imagination and judgment fitted to serve, with marked distinction, a wider more diverse clientele than had been thought possible. In giving architectural service to the needs of an era of vast building activity, you and your collaborators have won for the profession a wider understanding and appreciation.[74]

Skidmore's main contribution was the success of the organization, not his artistic achievements. He received this honor a year after his official retirement. As a fatherly figure to the firm, Skidmore's reception of the award was met with great celebration. If

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[73] *SOM News* 21, December 15, 1956.

[74] AIA Gold Medal, 1957, The Louis Skidmore Papers, Library of Congress.

there were any charismatic figures in the firm, he must have been the one. However, upon his retirement, the firm began relying entirely on the bureaucratic system. The last trace of a charismatic figure was finally gone and with it the traditional architect-artist.

Three Keys to Success

Skidmore once described the critical factor in the firm's design process. He did not discuss any design language or skill, but instead mentioned the importance of understanding the requirements of a project.

> Our philosophy of design is simple. Before pencil is put to paper, the owner's requirements are closely examined and thought out into a written program of requirements. Thus when the physical design is begun there is a clear basis of procedure. Incidentally, this is good for the designers' morale and for the job costs. This approach not only clarifies procedures in the office but gives the client confidence that his program is clearly visualized in principle[75].

SOM developed an efficient system of design production with a four step process: analyzing the client's needs, translating programming into preliminary drawings, producing working drawings, and supervising construction. By establishing this sequence

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[75] Louis Skidmore, "Speech for the AIA Gold Medal Ceremony," The Louis Skidmore Papers, Library of Congress.

of activities, SOM created a more efficient and systematic process.

In order to maintain cohesiveness of taste and technique, a coordinating partner was selected annually. This person's role was to coordinate administration and production as well as design. He also held monthly meetings among the four offices and assigned partners and staff members to specific phases of each project.[76] In addition, there was a partner in charge of design; the role went to Bunshaft in the New York office. Taking on different roles in an office, the firm helped partners better understand the general process of design. The purpose of this development was to achieve greater efficiency and flexibility. Buildings not designed by an individual architect were clearly recognized as different from those created by a group following a process referred to as "design by conference." In addition, SOM gave its clients an active role in design process. By incorporating the client as a part of the design process, the firm could prevent a lack of practical considerations and arbitrariness from the design process. Bunshaft contended that, "some good architecture is occurring because it isn't the whim of one genius – it's an intelligent effort of a client and a designer."[77]

In 1962, when a German publisher, Verlag Gerd Hatje, released a book on

[76] "$2-Billion Worth of Design by Conference," *Business Week*, December 4, 1954: 102-03.

[77] "The Team Approach: "The Team Approach: A Round-Table Discussion Reveals How Connecticut General Got Just What It Wanted from Designers," *Industrial Design* 5 (September 1958): 54.

SOM's work, *Architecture of Skidmore, Owings & Merrill, 1950-1962*, for which Hitchcock wrote the introduction. It was a brief yet revealing analysis of how SOM became representative of corporate architectural firms. For the book project and in particular for the introduction, Hitchcock initially approached Walther A. Netsch, one of the partners in the Chicago office. Realizing that he could not work with Hitchcock, Netsch asked Hitchcock to request the help of Robert W. Cutler, a partner in the New York office.[78] Hitchcock toured SOM's buildings with the help of the firm and worked closely with the partners on the preparation of the book.[79] In addition, Hitchcock shared the introduction developed with Mr. Cutler with all other partners and was willing to incorporate their opinions. For example, Hitchcock wrote in a letter to Mr. Cutler on November 5, 1961:

> I have also made a revision of the original introduction, omitting or modifying most of the recurrent references to Mies which I agree were excessive. I very much hope that you, your partners, and Hatje

[78] Walter A. Netsch, Letter to Henry-Russell Hitchcock, "Correspondence" Box 9, The Henry-Russell Hitchcock Papers.

[79] SOM arranged and paid for Hitchcock's travels to the firm's buildings. "Correspondence-SOM," Box 9, 10 and 11. Visual materials were prepared by the firm and presented to Hitchcock and to the publisher of the book, Gerd Hatje. Robert W. Cutler was deeply involved in deciding the general organization and content of the book. In a letter sent to Hitchcock, Cutler reported the progress of the business related to the publication of the book. "We have been working night and day going through it carefully to make sure that all errors are corrected… I sincerely hope that this [editing] meets with your approval." Cutler's letter to Hitchcock on September 12, 1962, "Correspondence" Box 11, The Henry-Russell Hitchcock Papers.

> will wish to include the longer historical introduction as well as the shorter new forward. I rather gathered that Bill Hartman and Walter Netsche [sic] thought the introduction worth including.[80]

Hitchcock sought reviews of his introduction from SOM partners. His description of the firm's history came from the firm itself. After the publication of the book, Cutler wrote to Hitchcock that, "I reread your Introduction with a great sense of satisfaction and respect for your able documentation of a difficult subject. My sincere congratulations for a job particularly well done."[81] Hitchcock's introduction and the rest of the book was the result of close collaboration between Hitchcock, Hatje, and the firm. SOM coordinated much of the publication process with Hatje. Hitchcock probed into the early development and future potential of the firm and delivered an eloquent, aesthetic review of the buildings. Considering Hitchcock's close collaboration with SOM, his characterizations of the firm in the introduction must have been reflective of the partners' idea of the firm. Based on Hitchcock's introduction and other writings such as "The Architects from 'Skid's Row,'" SOM's three unique approaches to architectural practice can be identified: its focus on

[80] Hitchcock, Letter to Cutler on November 5, "Correspondence" Box 10, The Henry-Russell Hitchcock Papers.

[81] Cutler, Letter to Hitchcock on January 9, 1963, "Correspondence" Box 11, The Henry-Russell Hitchcock Papers.

decentralization, the package deal, and a lasting relationship with its clientele.[82]

Though common today, decentralization was an innovation that SOM originally introduced. A year after its establishment in 1936, SOM split their offices, situating them in the Midwest and on the East Coast. While Owings remained in Chicago running the original office, Skidmore set up the firm's second office in New York. Before long, in addition to the original Chicago (1936) and New York (1936) offices, Oak Ridge (1942-46), San Francisco (1946) and Portland (1951) offices were established.[83] By the mid-1950s, SOM had four offices (Chicago, New York, San Francisco, and Portland) located across the country working on projects across the United States and in many other parts of the world. The four offices divided the world map into four areas. The New York office undertook projects on the East Coast, in Europe, in the Middle East, and in South America; the San Francisco office served the West Coast and the South and Far East. The Portland office, which was developed in association with Pietro Belluschi, operated in the Pacific Northwest and Alaska. The Chicago office, the administrative center of the firm, covered projects in all other sections of the country.[84]

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[82] In addition to the other two articles, Sheri Olson, "Skidmore, Owings & Merrill: Early History," in Robert Bruegmann, ed. *Modernism at Mid-Century: The Architecture of The United States Air Force Academy* (Chicago and London: The University of Chicago Press, 1994), 27-28.

[83] Hitchcock, "Introduction," *Architecture of Skidmore, Owings & Merrill, 1950-62*, 8.

[84] William E. Hartmann, "S.O.M. Organization," *Bauen und Wohnen* 12 (April 1957): 116.

Decentralization was a challenge because of the great distance between offices and the unique identity of each. The benefit, however, far outweighed the challenges. In January 1958, *Fortune* magazine reported that "its four regional offices operate autonomously in their own areas but join forces as needed for national and international accounts, so there is considerable switching of specialists, facilities, and jobs among offices." The synergy of the diverse resources of the firm was compared to a "collective blaze."[85] Furthermore, the partners realized that the difficulty of decentralization would be lightened externally by emerging communication and transportation technology and internally by the standardization of design. Alan Colquhoun recently noted that standardization could be epitomized as "maximum flexibility of spatial planning; maximum standardization of part and modular coordination of all systems; air conditioning; fully glazed and sealed curtain walls; all-day artificial lighting; and deep office space."[86] SOM understood that unifying the firm's production and standardizing its organization in a manner that paralleled the standardization of the building industry were crucial steps for a successful architecture business. For this reason, every project was organized in the same manner in all of SOM's regional offices. According to

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[85] "The Architects from 'Skid's Row,'" 139.

[86] Alan Colquhoun, *Modern Architecture* (Oxford University Press, 2002), 239.

Hitchcock, this new decentralized organization was a feature of an "enlightened" architectural bureaucracy.[87]

Another characteristic of SOM's business practice was the 'package deal' which included master-planning, engineering, and construction supervision as well as architectural design. This comprehensive design package became possible when Skidmore and Owings invited architect-engineer John O. Merrill to join them in 1939 as a limited partner. Merrill made a big contribution to the young architecture firm, enabling it to provide their clients with more services. Those who would be accepted as general partners were chosen for the same purpose: Severinghaus became a housing expert; Cutler became a hospital expert; Brown became a prefabricated housing specialist; and Bunshaft became the designer of SOM style. Skidmore later described the strategy as follows:

> Up until the War most U.S. architects were trained to work only on small plots, they left the problem of coping with large scale projects – industrial plants, and airfields – to the engineers. We felt that if the architect wasn't to limit himself to domestic housing he would have to win back his role as the creator and coordinator of big projects.[88]

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[87] Hitchcock, "Introduction," *Architecture of Skidmore, Owings & Merrill, 1950-62*, 10.

[88] "The Architects from 'Skid's Row,'" 210.

The central issue in this statement is how to attract large-scale projects which were then being awarded primarily to engineers. The market and the corporate clients were the driving force of the organizational changes. After the introduction of the package deal, SOM could attract much larger, more diverse projects from both industry and government.

In terms of organizational structure, each of the four SOM offices was quite similar. Under a managing partner, there were five functioning groups. They were composed of A. Project Management, B. Design (Programming, Design of Project, Interiors, and Material and Methods Research), C. Construction (Contracts, Construction Supervision, and Field Offices), and D. Administration (Office Procedures, Records, Accounting, and Non-technical Personnel). These different groups reflect the nature of SOM's transformation of traditional architectural practice. New architectural practice required construction-related personnel and a large group of administrative staff. Design required the collaboration of various specialists.

> The design team has assigned to it engineering specialties, either from within S.O.M. or from consultants, to assist in solution of technical phases of projects. An intimate relationship is encouraged among the designer, the electrical engineer, structural engineer, and other specialists in such fields as acoustics, landscaping, process engineering, plumbing or air conditioning.
> The final building resulting from this approach reflects all these

> technical elements, coordinated and integrated in the overall concept by the architect. S.O.M. recognizes the increasingly vital role that the mechanical systems will play in modern buildings in the United States and undertakes research into new developments in this area as well as structures, materials, and construction techniques.[89]

Hartmann's description of architectural practice at SOM reveals its complexity and collective nature, emphasizing the significance of rational communication among people involved in the project. The growing importance of the mechanical systems of a building required an entirely different approach to architecture. Hitchcock fully understood the loss of individuality within such organization but remained unconcerned. On the contrary, worried about the "hysterical vitality" of the architect-designer, he emphasized SOM's unsurpassed achievements made possible by the "relative looseness of the SOM organization, the importance of designers in its hierarchy, and the inclusion of engineers" in the firm.[90]

SOM's third business strategy was to foster a lasting connection with its clients which significantly helped expand the firm during and after the Second World War. As *Business Week* pointed out, SOM's relationship with its clients was far different from, for

[89] William E. Hartmann, "S.O.M. Organization," 116.

[90] Hitchcock, "Introduction," *Architecture of Skidmore, Owings & Merrill, 1950-62*, 10.

instance, Frank Lloyd Wright's patron-architect relationship. "SOM gives its clients an active part in the planning, rather than regarding a contract as a commission to go all-out on its own ideas of design."[91] Clients took so active a role in the design process that Bunshaft portrayed their every jot as a "marriage of owner and architect."[92] Recalling the Chicago Fair, Owings testified that Skidmore exerted extreme power over design related issues at the fair and had connections with the leaders of the business world of the day.[93] Skidmore and Owings began to develop long-lasting connections with the leaders of large businesses and governments at the Chicago fair of 1933. These connections accelerated during the New York World's Fair of 1939. Throughout the 1930s, the world's fairs were the primary venues for industrial designers, architects, government and corporate leaders to escape momentarily from the gloomy shadow of the Depression and promise Americans a brighter future. The importance of these fairs to the formative years of SOM should not be underestimated. Skidmore and Owings met their strongest supporters and friends there. Among these people were Howard Heinz, president of the Heinz Company, John Kimberly of Kimberly-Clark and Robert Moses; these relationships continued for a

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[91] "$2-Billion Worth of Design by Conference," 104.

[92] Gordon Bunshaft, quoted in the above article.

[93] Owings, *The Spaces in Between*, 44-60.

long period of time.

The significant government connection began with the Oak Ridge project. Through the project, SOM gained experience in housing; commercial, religious, and municipal buildings; and roads and utility systems.[94] Working confidentially with regard to the project's purpose, SOM assembled an on-site practice involving 450 architects, engineers, and surveyors. Hitchcock stated that the experience in Oak Ridge "laid the organizational foundation for undertaking the extensive and varied private commissions that came their way in increasing numbers when the building curve turned upward two or three years after the War was over."[95] The strong relationships with business and governmental clients helped the firm become active not only in Chicago, New York City, San Francisco, and Portland but also in such far-flung places as Venezuela, the Philippines, Morocco, and Okinawa.

Despite Hitchcock's support of the "Architecture of Bureaucracy" in 1947, harsh criticisms of corporate architecture have appeared over the last several decades. Rather than helping us understand, the dichotomy that the historian described has been

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[94] Owings, "From Oak Ridge to Manhattan and Way Stations," Speeches and Writings File, Box 53, The Nathaniel Alexander Owings Papers, Library of Congress. The speech was given before the Wayfarers at the Cichigo Club on October 15, 1946.

[95] Henry-Russell Hitchcock, "Introduction," *Architecture of Skidmore, Owings & Merrill, 1950-62*, 8.

used to demonize bureaucratic architecture. The critics and architects who criticized corporate architecture employ it as a negative contrast to the so-called creative architecture which can supposedly only be achieved at the hands of a creative individual or a genius. It seems that Wright's argument, genius versus the mob, became the new guideline for understanding corporate architecture. The possibility of teamwork produced by creative individuals working together, as in Giedion's earlier description of SOM, no longer seems to be legitimate.

What, then, was Hitchcock as an architectural historian really trying to achieve throughout this whole process? He played a dual role in the game of writing the history and theory of modern architecture: identifying and permanently isolating the architecture of bureaucracy and maintaining formalism. Two types of modern architecture, corporate and creative, were identified. While the former is now understood as something contaminated by corporate culture, the latter is accepted as something architects should pursue. In some sense, Hitchcock's architecture of bureaucracy was a shrewd way of manipulating history. As a result, our contemporaries find, in Hitchcock's concept, a justification for returning to the mystical world of forms.

SOM's bureaucratization of architecture was the result of a broader and pervasive rationalization in the modern world. Weber considered rationalization the very essence of modernization. Yet, in architectural history, bureaucracy was positioned as the artificial interloper, the enemy of "true" or "creative" architecture. It should not be forgotten that two constructed modernisms, corporate and true, came to define each other within a confined sphere of operation. Figures like Hitchcock, Wright, and Giedion helped contribute to this framework. However, to grasp the multi-layered social, technological and cultural meanings of a building, it is urgent to overcome the concept of architecture as an art.

Upon Skidmore's retirement in 1956, SOM's lawyer, Marshall G. Sampsell, sent a letter to the State of California to inquire if SOM could keep Skidmore's name in its title. The state answered that if Skidmore was paid as a consultant, SOM's use of the name Skidmore, Owings & Merrill in California was "not in violation of Business & Professional Code §5580."[96] Similar to Skidmore, when Merrill retired in 1958 and became a consultant, there was little concern about keeping the name intact. However, Skidmore's death in 1962 created confusion and concern among the firm's partners. Firmly believing that the name Skidmore, Owings & Merrill could not be altered, the partners at SOM considered many options including adding descriptions regarding

[96] Philip S. Mathews of San Francisco law office, Ackerman, Johnston, Johnston & Mathews, Letter to the Chicago Law office Isham, Lincoln & Beale on October 6, 1962, "Skidmore, Owings & Merrill: Firm Name in California," Box 8, The Nathaniel Alexander Owings Papers, Library of Congress.

Skidmore's death.[97]

Upon facing the same problem in Oregon, Sampsell pursued a permanent solution. In order to prevent any future issues, he proposed "to attempt to have the statute amended" at the state legislature session "so as to permit indefinite use of the name of Skidmore, Owings & Merrill in Oregon."[98] He also advised the partners to consider an alternative solution in case his attempt did not work out: the appointment of Louis Skidmore, Jr. as a member of the Oregon partnership.[99] All of the partners and Sampsell believed that keeping the name of "Skidmore, Owings & Merrill" was essential for the firm. They understood that the firm had moved beyond individual partners and that the partners belong to the firm, not the other way around.[100] However, these legal troubles showed the partners that their architectural practice was at risk of doing illegal business

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[97] Ibid.

[98] Marshall Grosscup Sampsell of Isham, Lincoln & Beale, "Memorandum: Reuse of the Name Skidmore, Owings & Merrill in the State of Oregon," February 14, 1963. Box 8, The Nathaniel Alexander Owings Papers, Library of Congress.

[99] Ibid.

[100] The Dissolution of the Firm and the Use of Partners Names in the Partnership Agreement of SOM in 1960 are good examples of the priority of the organization. Each partner kept his copy after everyone signed it. "The Firm may be dissolved at any time by an instrument in writing signed by Partners holding not less than 75% of all Class A Units and all Class B Units then outstanding." This means to dissolve the firm, the majority of the partners, particularly seniors, should agree on it. Regarding the use of partners' names, "The Firm shall have the right to use, in whole or in part, the name of any Partner or former Partner in the name of the Firm, or otherwise in connection with the practice and business of the Firm…" "Articles of Partnership of Skidmore, Owings & Merrill," October 1, 1960, "Financial and Legal File," Box 21, The Nathaniel Alexander Owings Papers, Library of Congress.

under a “fictitious name.”[101] This predicament originated from the growing rift between SOM’s organization and the old, legal definition of architectural practice. Architectural practices were traditionally based on an individual or a group of individuals. But, SOM pursued a collective identity, or “Modern ‘Gothic Builders Guild.’”[102] It was not an architectural firm based on the creativity of a single individual. The firm outgrew the conventional definition of architectural practice.

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[101] Philip S. Mathews, Letter to the Chicago Law office Isham, Lincoln & Beale on October 6, 1962

[102] When describing the beginning of SOM with the idea of a “Modern Gothic Builders Guild’ as an ideal, Owings emphasized having a social impact and believed creating a large organization would accomplish this goal. “We were after leverage to influence social and environmental conditions. To work, we must have volume. An efficient set of master builders can eat up a lot of work. Volume meant power.” Owings, *The Spaces in Between*, 61-70.

CONCLUSION

By the 1950s, SOM was known as one of the greatest modern architecture-engineering practices in the world. The transformation from a small design office in the 1930s to one of the largest firms in the world by the 1950s was achieved not just during, but in response to two cataclysmic events – the Great Depression and World War II – that had resounding effects on the United States and the entire world. SOM greatly advanced by taking up pressing social issues related to architecture, including the commercialization and industrialization of buildings, that grew out of these historical events. In doing so, the firm reformulated the concept of architecture and its practice.

The organizational and architectural vision of the two founding partners, Louis Skidmore and Nathaniel A. Owings, served as a guide for the firm during three pivotal decades. The two led the firm, from its inception to its expansion, through its younger partners and a growing staff of professionals. Central to their vision was the question of how to better serve humanity. They believed they could accomplish this by modernizing architecture and utilizing new sociological and scientific research about people and their interactions. Upon receiving the Gold Medal from the American Institute of Architects in

1957, Skidmore spoke about what architecture and its practice should mean in modern society. He argued that,

> the scope of the profession of architecture was far greater than had been realized, and we have never found its boundaries closing in. Because architecture, even it its narrowest limits, is the housing of all human activities, it immediately involves all the approaches to, and the extensions of those activities. The boundaries recede at once, and the architect discovers the need of knowing all that he can learn of human living, of its needs, its conduct, and its ends.
> The architect must, therefore, constantly, grow in stature, and his younger partners with him; and the collaboration must have a life beyond and greater than his own, that its services may be continuous to the continuity that it serves.[1]

Skidmore suggested that architecture should be practiced with the goal of accommodating all human activities. Therefore, the practice of architecture required an understanding of the psychological, physiological and economic needs of human beings. The architect must be able to understand architecture as more than just a formal issue since it is a combination of technical innovation and professional expertise on people and their environments. While some architects and critics focused on the stylistic aspects of modernism, Skidmore in particular proclaimed a more comprehensive approach to

[1] Louis Skidmore, "Remarks by Louis Skidmore in Accepting The Gold Medal of the American Institute of Architects, Washington D.C. May 16 1957," "Subject File-Louis Skidmore," Box 41, The Nathaniel Alexander Owings Papers, Library of Congress.

architecture. A large, well-managed firm, equipped with various professionals and specialties, was the necessary evolution of an architectural practice in order to meet the demands of complex modern projects.

For Skidmore and Owings, modern architecture was closely related to society's modernization and to aspects of everyday life. The potential of modern industrial technology, including new materials and advances in building technology, was critical. Skidmore and Owings understood modern architecture in a much broader sense than its formal aspects. They saw it as an expression of a new condition of life: technological, artistic and rational. A rational understanding of human beings, scientific organization of interior space and an innovative construction technology were important components. Modern architecture was an effort to elevate the built environment with the help of science and technology.

Skidmore and Owings were not unique in these aspirations. The catalogue, *What Is Modern Architecture?*, published by the Museum of the Modern Art as the first publication of the *Introductory Series to the Modern Arts* in 1942, defined the modern architect as a scientist, a psychologist, and an artist.[2] As a scientist, the modern architect "must depend on the scientific point of view" to solve many new practical problems. As a

[2] Museum of Modern Art, *What Is Modern Architecture?* (New York: Museum of Modern Art, 1942), 5.

psychologist, the modern architect must have “the human insight necessary to construct an architectural environment which will be psychologically pleasing to his clients.” And finally, as an artist, the architect must give a building beauty.[3] While the catalogue identified formal characteristics such as the open plan, continuous, flowing space and a lack of ornament as characteristics of a modern aesthetic, it also paid special attention to practical issues such as new construction methods and new materials. Modern architects were concerned with such utilitarian subjects as program, equipment, and site. Furthermore, large-scale planning was necessary to be modern.[4] While to some people modern architecture was almost entirely an issue of certain formal expressions, the catalogue suggested modern architecture should be a combination of new scientific, psychological, practical and artistic considerations. This comprehensive and rational definition of the modern architect represents Skidmore and Owings’s vision for their firm.

The experiences which occurred during the Great Depression and the Second World War helped SOM construct its organizational structure and identity. During these transformative times, Skidmore and Owings expanded and realized the opportunity for a new type of architectural practice. In tackling two of the greatest and most urgent crises

[3] Ibid.

[4] Ibid, 6-18.

of modern society, the firm grew to become a model of team-based architectural practice. Skidmore and Owings advanced architectural practice by recognizing the transformations that were taking place in the profession and society as a whole. After the Second World War, the firm expanded its efforts to provide the entire globe with comprehensive services, dividing the world map into several areas based on the locations of their local offices. In doing so, SOM was able to further develop their sophisticated yet abstract designs, technical expertise in building technology, and an advanced bureaucratic organization. The scope of SOM's expertise allowed the firm to undertake architectural and engineering projects that other architectural firms could not have handled.

Skidmore and Owings learned critical lessons during the first ten years of the firm's existence even though their commissions were relatively small. They foresaw how the profession of architecture could take on a more important role in a society that had suffered from the economic cataclysm of the Depression and the turmoil of the war. In the 1930s, Skidmore and Owings realized the importance of interacting with the public. During such a serious financial crisis, architects attempted to attract the public's attention, transforming buildings into easily recognizable products. While working at the two World Fairs of the 1930s held in Chicago and New York, Skidmore and Owings were exposed to industrial design and learned the importance of the public to the fate of design.

Recognizing that the success of industrial design products was based on the designers' ability to visualize and embody the taste of the public, they attempted to internalize a more legible approach to architectural design.

During the same period, Skidmore and Owings developed an acute awareness of the relationship between design and people's reactions that could be called a psychological approach to design. Spatial or formal design was understood as an instrument to create certain psychological effects. When SOM applied their findings to commercial and exhibition spaces, these effects replaced the authority of forms. At the Chicago Exhibition of 1933, Skidmore developed the idea of an architecture of performance that was impermanent and functioned only for a brief period of time. Skidmore's idea was architecture with a short life-span, but of heightened psychological impact. During this period, the firm's main projects were relatively small stores, exhibitions and houses for various companies; yet this idea of architectural performance would be essential to the firm's design of its much larger post-WWII office buildings.

Even as they were working on their first architectural commissions for the Chicago fair, Skidmore and Owings realized the importance of housing in a depressed market with a high rate of homelessness. This initial interest was furthered by the firm's activities with the John B. Pierce Foundation in 1939. SOM worked closely with the

Pierce Foundation to develop low-cost prefabricated prototypes and gain expertise on human behaviors in domestic environments. All elements, including human beings and their usual activities in the domestic environment, were measured and calculated to facilitate standardization and mass-production of a building prototype and its component parts. The research completed with the Pierce Foundation helped SOM advance its technical expertise on building technology, including curtain wall construction.

The turning point in SOM's formation as a large, architecture-engineering firm was the Manhattan Project during World War II. Between 1943 and 1945, the firm dramatically increased its personnel and developed a truly rational and modern organizational structure, which was required by the commission's complexity, autonomy and extreme time pressures. Through the Oak Ridge commission, SOM grew from a small design firm to a large-scale, multi-service firm, mass-producing a vast number and various types of prefabricated buildings for the military. While working on the design of the city and numerous buildings necessary to normal life, SOM developed the capacity to deal with large-scale projects and integrated competent personnel from various fields. The two partners understood that a complex organization was essential to tackling these diverse, fast-track programs and the complicated construction that resulted from such projects.

With the end of WWII, public knowledge of Oak Ridge gave SOM an enviable international reputation as a leader in modern architecture. SOM's war-time experience helped the firm develop the expertise to construct some of the finest post-Second War office buildings. SOM designed headquarters for some of the largest corporations and financial institutions in the country. In addition, SOM built some of the largest and most complex military projects. The firm developed a distinctive design system based on teamwork. Rather than relying on a single genius, SOM's design process was based on the expertise of a group of professionals. The vast size as well as the technical and spatial complexity of large modern architectural and engineering projects required the firm to develop a new approach. A building was understood as a combination of different parts as each professional was a member of a larger group.

An interesting comparison exists between a prefabricated building and a large corporate organization in terms of the relationship between a unit and the whole. Whether it is a prefabricated building or an organization, it is critical to maintain flexibility in order to enhance the various combinations of the parts. In the building, parts should be easy to assemble and dissemble. SOM similarly developed an idea of flexibility in its design process. Each unit was standardized to be repeated as much as was necessary. Modules and sufficient mechanical equipment were employed to secure spatial flexibility.

In doing so, it was possible for SOM to produce exemplary glass and steel office buildings which were technically advanced and spatially flexible. However, it would be unfortunate if SOM in the 1950s was remembered only as a producer of office buildings. While designing and constructing some of the best modern buildings in the United States based on newly developed ideas of flexibility and abstraction, SOM continued building large-scale developments in foreign countries. As in Oak Ridge, the firm designed and built towns, airports and military complexes around the world. In the 1950s, the volume of SOM's design and construction activities was not reduced but rather dramatically increased.

Learning critical lessons at each stage of their projects, the firm developed new, more efficient office and construction systems. These systems continuously focused on process rather than final form. Even during the war, SOM was no longer an architecture firm in a traditional sense. *Fortune* magazine called SOM's design and planning process "an exercise in group intelligence."[5] More and more, the firm's design and construction were highly systematized. Its team-oriented design processes allowed many different professionals to collaborate. Mechanical, structural, spatial, formal, and economic considerations as well as the clients' pragmatic interests and legal concerns were all

[5] "The Architects from 'Skid's Row,'" *Fortune* (January 1958): 212.

incorporated into the general design process. For this firm, design was the coordination of all of these considerations.

This study of the formative decades of SOM reveals several pervasive shifts in modern American architecture in the 1930s and 1940s. SOM's history discloses shifts in design considerations from the internal logic of forms to people and their reactions, that is, a psychological approach to design, from small-scale architecture-design to large-scale multi-service operation and from atelier to corporation. SOM built its success perfecting these transitions. The changes were in part the result of pervasive historical shifts that resulted from the transformation of American society in the 1930s and 1940s. Skidmore and Owings were able to combine many existing ideas about modern architecture, including certain formal characteristics, economy of construction and teamwork, with the new demands of an evolving society. In so doing, they created a new kind of firm. Modern spatial organization based on scientific research on human activities, innovative construction technology, rational architectural practice, and modern forms were all an important part of modern architecture for SOM.

At a time when many architects, both modern and historicist, were still preoccupied with style and form, the new firm of SOM self-consciously attempted to modernize architecture as a whole. The firm's conception of modern architecture was based on the scientific analysis of human activities and the categorical classification of different types of programs and sizes of spaces, together with systematic design processes and industrialized construction. SOM's contribution to the development of modern American architecture in the middle of the twentieth century is found not only in the technical perfection and the innovative spatial, structural, and formal characteristics of its individual buildings, but also in the first broad, pragmatic rethinking of the very nature of architecture and the architectural firm.

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ILLUSTRATIONS

TABLE I: ARCHITECTS' PARTICIPATION IN BUILDING PROGRAMS
(Contract statistics for 37 Eastern States—F. W. Dodge Corporation)

Year	Total Building* Contracted For	Total Planned by Architects	Number of Participating Firms	Average Business Volume per Office
1928	$5,217,942,800	$3,639,018,800	9,087	$400,000
1929	4,336,025,100	2,917,148,700	8,255	353,000
1930	2,907,303,700	2,108,804,900	8,240	256,000
1931	1,986,837,000	1,391,356,000	8,129	170,000
1932	779,022,600	500,827,700	5,291	95,000

*Does not include public works and utilities, except the occasional jobs of this class which are planned by architects.

Fig. 1.1

Architects' Participation in Building Programs, Contract Statistics for 37 Eastern States by F. W. Dodge Corporation. From Thomas S. Holden, "How Many Architects Are Carrying On?" *Architectural Record* (July 1933).

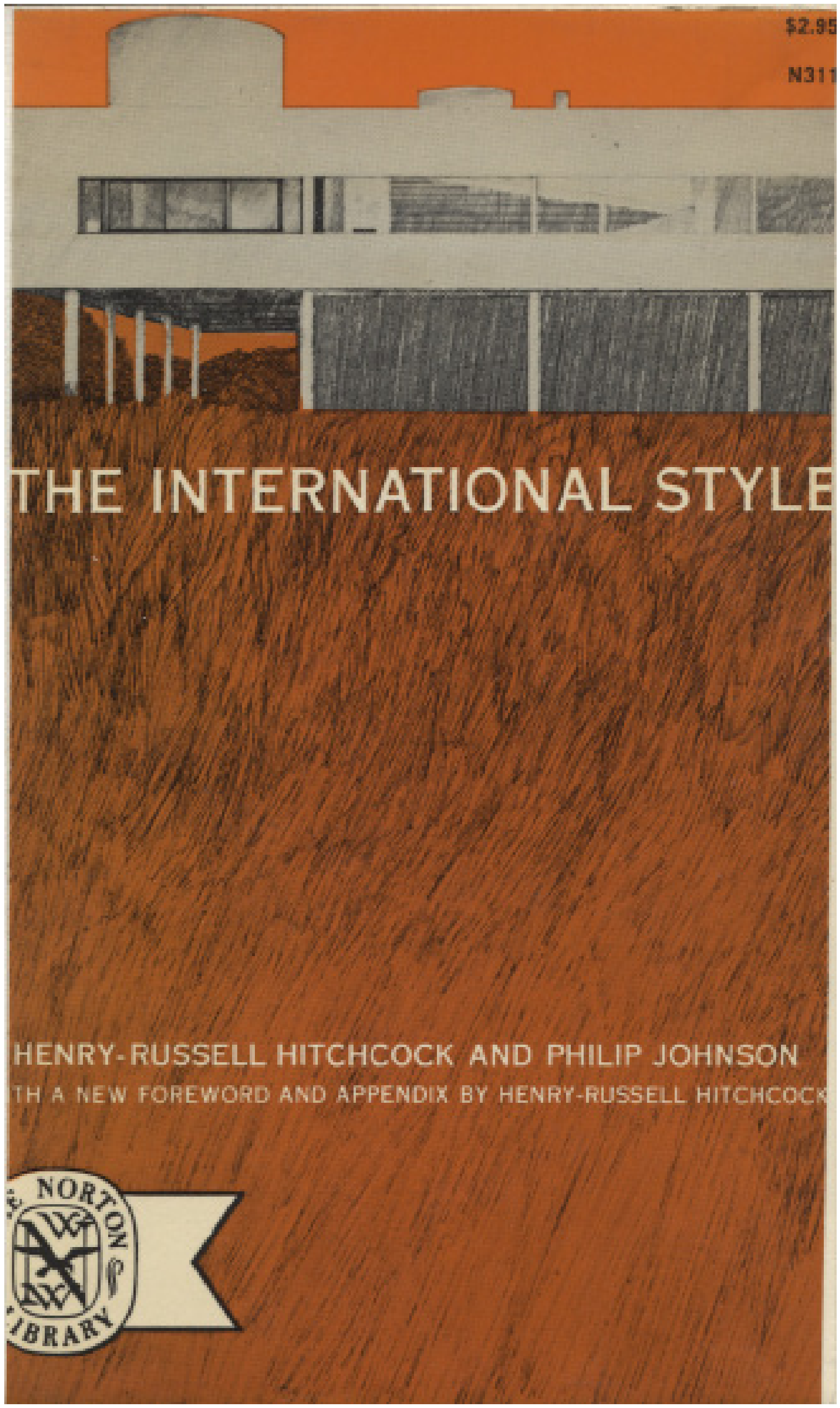


Fig. 1.2

Cover. Henry-Russell Hitchcock and Philip Johnson, *The International Style*. 1932. New York: W. W. Norton, 1966.

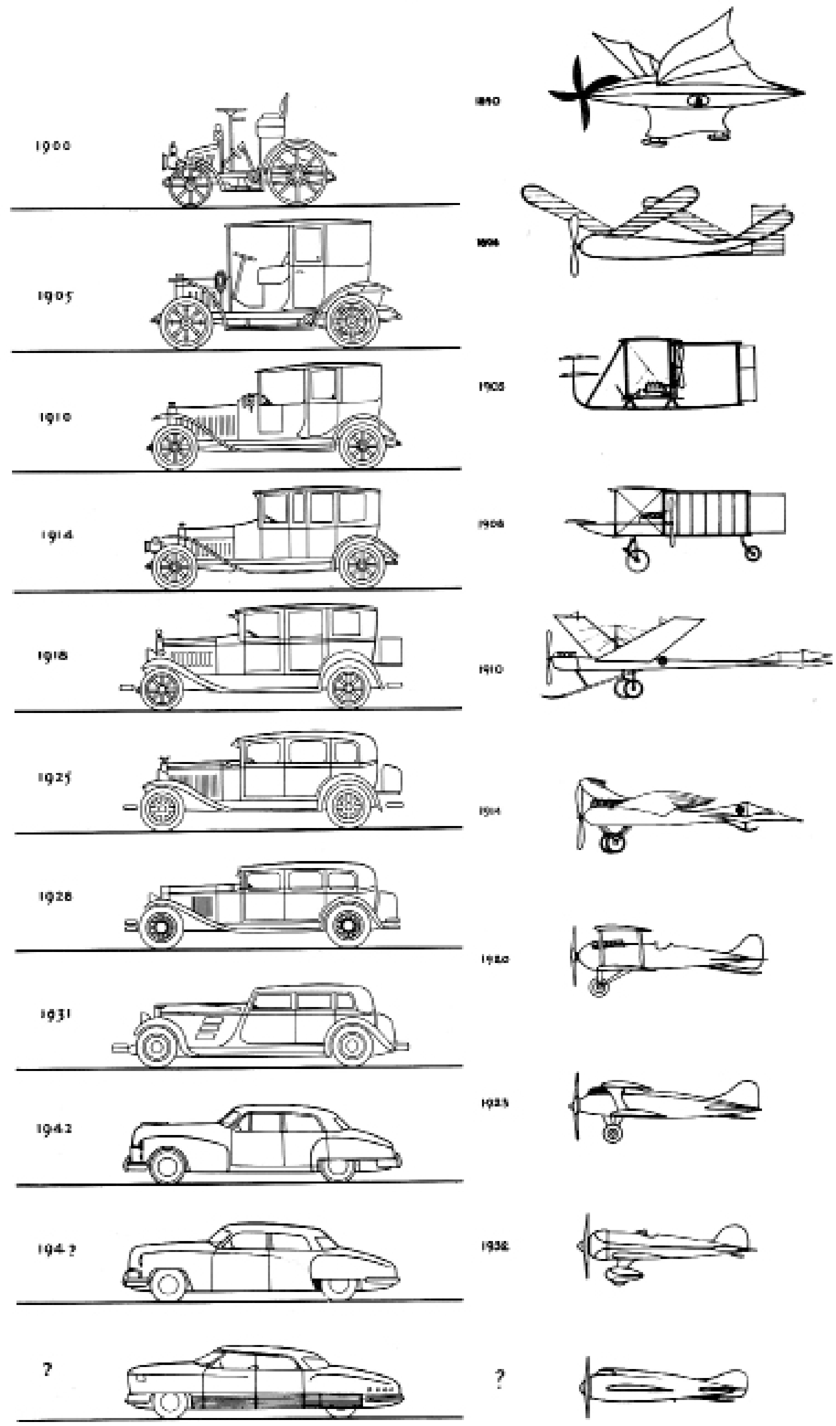


Fig. 1.3

Evolution Chart of Design (1930) by Raymond Loewy. Reproduced in Martin Greif, *Depression Modern: The Thirties Style in America*. New York: Universe Books, 1975.

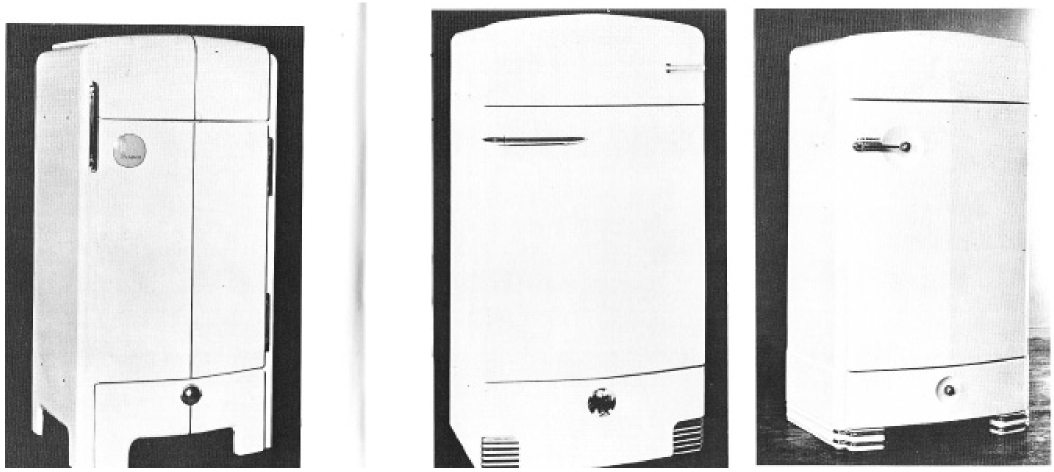


Fig. 1.4

Sears Coldspot Refrigerators (1936, 1937 and 1938 models from left) by Raymond Loewy. From Jeffrey L. Meikle, *Twentieth Century Limited*. Philadelphia: Temple University Press, 1979.

Fig. 1.5

Electric Toaster (1932) by Henry Dreyfuss. From J. Stewart Johnson, *American Modern, 1925-1940*. New York: Harry N. Abrams, 2000.

Fig. 1.6

Thermos Carafe and Tray (1935) by Henry Dreyfuss. From J. Stewart Johnson, *American Modern, 1925-1940*. New York: Harry N. Abrams, 2000.

Courtesy Kemp Starrett from the "New Yorker"

"Gentlemen—I Am Convinced That Our Next New Biscuit Must Be Styled by Norman Bel Geddes"

Fig. 1.7

Kemp Starret Cartoon (1932). Reproduced in "Both Fish and Fowl." *Fortune* (February 1934) with the caption, "Gentlemen—I Am Convinced That Our Next New Biscuit Must Be Styled by Norman Bel Geddes."

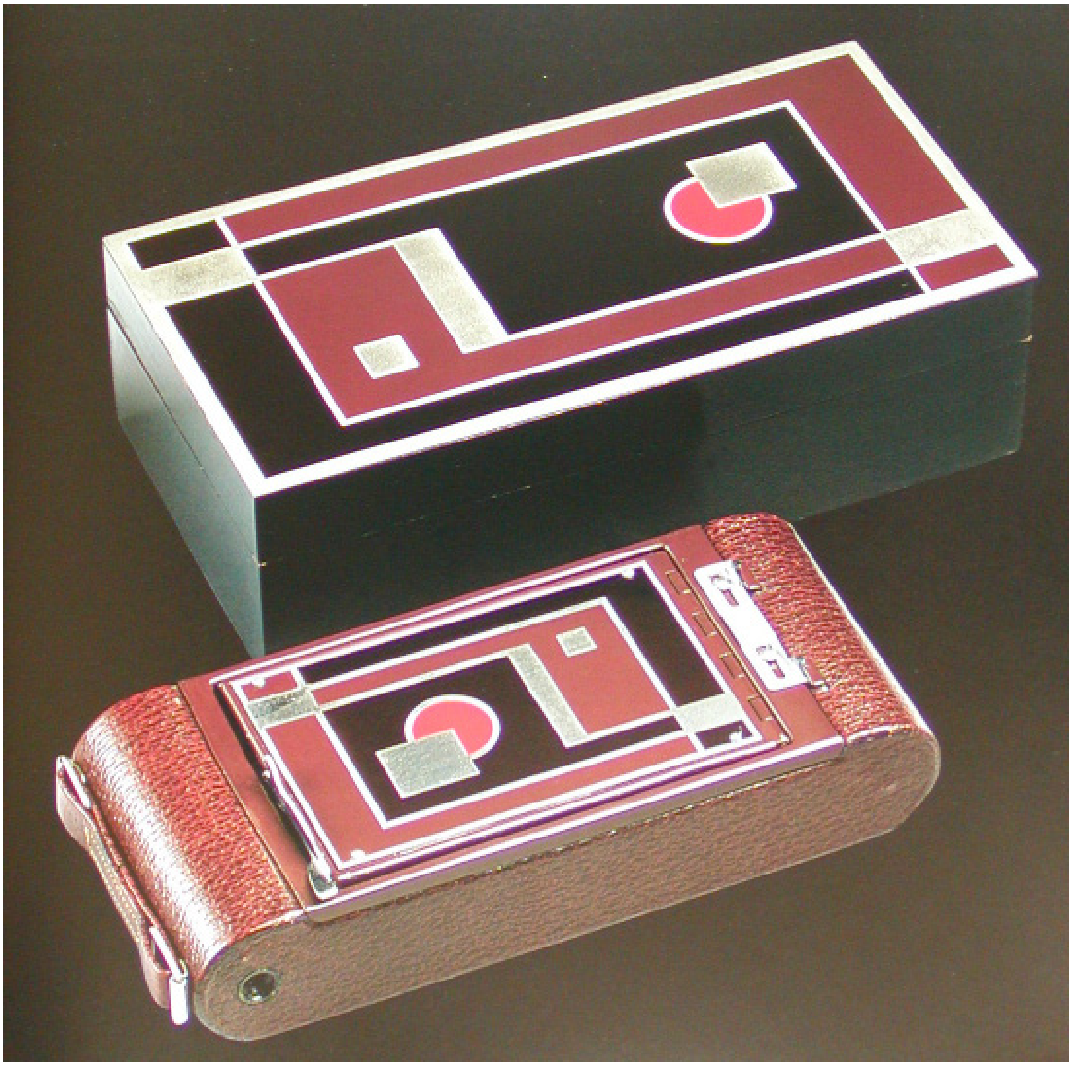


Fig. 1.8

Camera and Box (1930) by Walter Dorwin Teague. From J. Stewart Johnson, *American Modern, 1925-1940*. New York: Harry N. Abrams, 2000.

Fig. 1.9

“Soda King” Syphon Bottles (1938) by Norman Bel Geddes and Worthen Paxton. From J. Stewart Johnson, *American Modern, 1925-1940*. New York: Harry N. Abrams, 2000.

Fig. 1.10

Studio by Raymond Loewy and Lee Simonson for the 1934 Contemporary American Industrial Art Exposition at New York's Metropolitan Museum of Art. Reproduced in Martin Greif, *Depression Modern: The Thirties Style in America*. New York: Universe Books, 1975.

Fig. 1.11

Texaco Service Station by Walter Dorwin Teague. From *Architectural Record* (September 1937).

Fig. 1.12

Interior of the Broadway Limited Train by Raymond Loewy and Paul Cret. From *Architectural Forum* (September 1938).

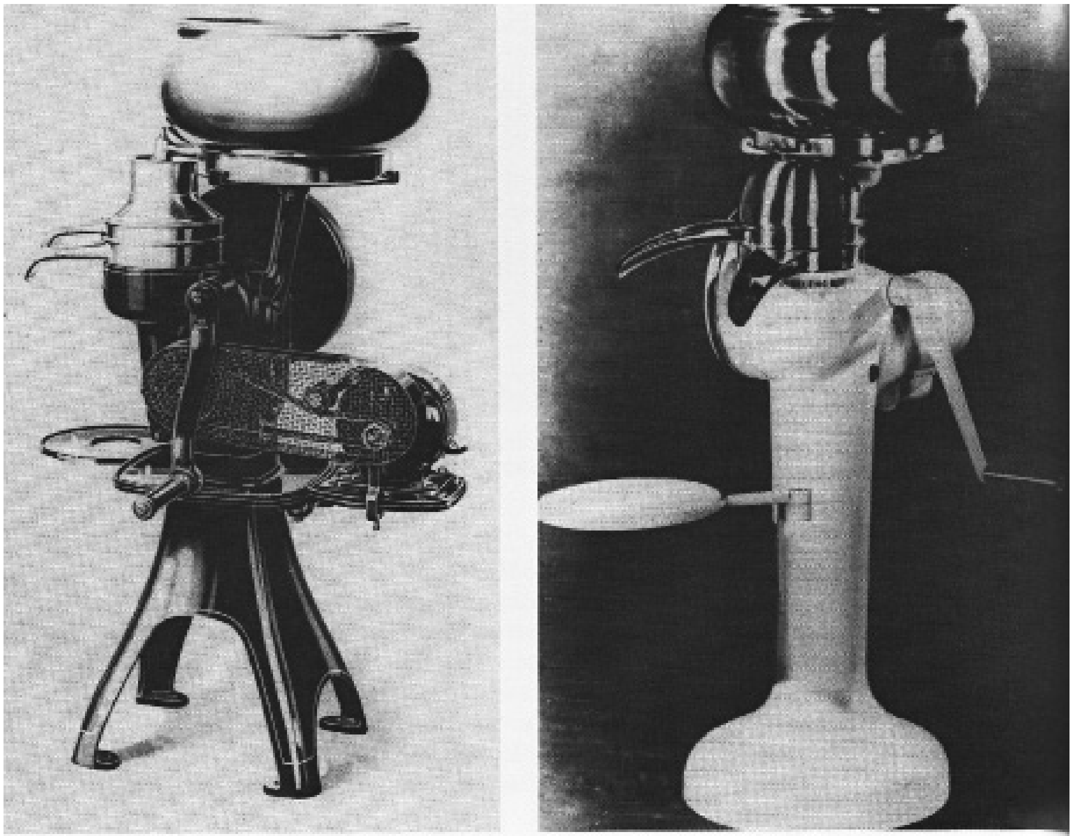


Fig. 1.13

International Harvester Cream Separator by Raymond Loewy. Before (left) and after (1939) redesign in 1939. From Donald J. Bush, *The Streamlined Decade*. New York: George Braziller, 1975.

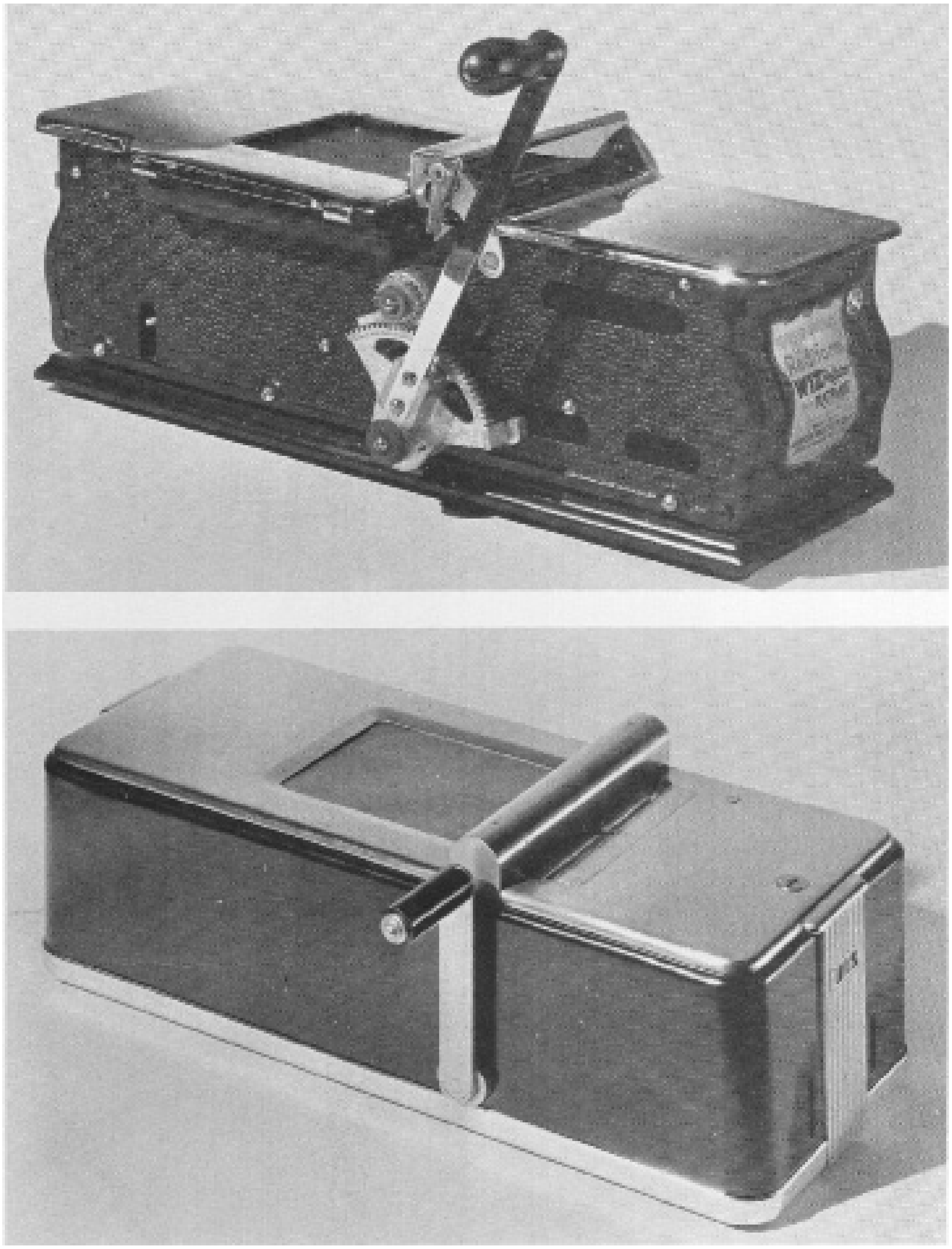


Fig. 1.14

The American Sales Book Wiz Register before (above) and after redesigning by Walter Dorwin Teague in 1934. From Donald J. Bush, *The Streamlined Decade*. New York: George Braziller, 1975.

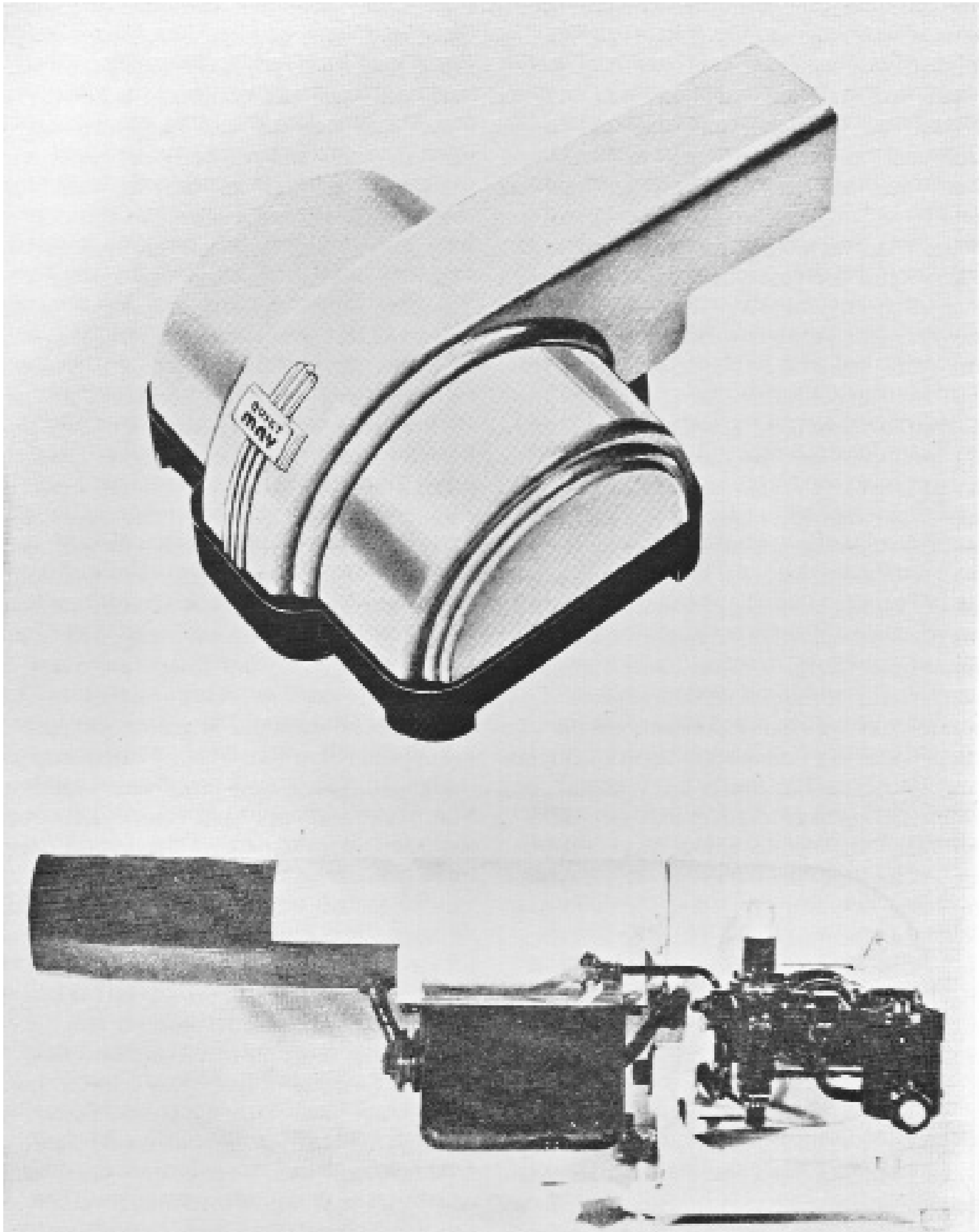


Fig. 1.15

Quiet May Oil Burner before (below) and after redesigning by Lurelle Guild in 1934. From Sheldon Cheney and Martha Candler Cheney, *Art and the Machine*. New York: Acanthus Press, 1936.

Fig. 1.16

Philadelphia Savings Fund Society Building (PSFS, 1928-32) by George Howe and William Lescaze. Hagley Museum and Library.

Fig. 1.17

Lower part of the PSFS building

Fig. 1.18

McGraw-Hill Building (1930-31) by Raymond M. Hood and J. André Fouilhoux. Wurts Brothers photograph.

Fig. 1.19

Front Entrance. McGraw-Hill Building (1930-31) by Raymond M. Hood and J. André Fouilhoux. From Richard Guy Wilson and Dianne H. Pilgrim, *The Machine Age in America, 1918-1941*. Brooklyn, N.Y.: Brooklyn Museum, 1987.

(Left)
NORMAN BEL GEDDES: Eight years' experience in industrial design. He has created radio cabinets, furniture, refrigerators, office, restaurant and airplane interiors, the medal to commemorate the silver anniversary of General Motors, which is part of the permanent exhibit at the Metropolitan Museum of Art, gas stoves, window displays, automobile tires, and gasoline service stations. (Photograph by Maurice Goldberg.)

(Right)
GEORGE HOWE: From 1913 to 1928 in partnership with Walter Mellor and Arthur L. Meigs in Philadelphia; from 1930 to 1934, with William Lescaze. Notable among his architectural works are the Philadelphia Savings Fund Society Building; "Square Shadows," the home of William Stix Wassermann in Whitemarsh, Pa., which was the first completely modern residence to appear in the Philadelphia countryside; the Speiser town house in Philadelphia; the American War Memorial at Bony in France. He has also designed the Oak Lane Country Day School in Philadelphia, the Hessian Hills Schools, Croton-on-Hudson, the project for the Chrysler-Forsyth low-cost housing development, and, among others, the interiors of the Trans-Lux Theatres. (Photograph by Frances R. Waite.)

A NEW AND SIGNIFICANT TYPE OF PARTNERSHIP

has been formed by George Howe, well-known architect, and Norman Bel Geddes, industrial designer. It is the announced purpose of the organization to provide domestic or commercial building owners with a broad survey of mechanical and architectural trends for their consideration and use. With a fresh outside point of view it sets before the industrialist the needs and demands of the public as related to his established technical and business methods in such a way that he can reach decisions as to products and policy affecting not only a particular problem, but often his whole field of activity. The firm offers service in the following categories of design: consumer research; engineering; production; merchandising; architecture—domestic, commercial, industrial; theatrical; landscape; exterior and interior illumination; household and mechanical equipment; decoration; furniture; accessories; merchandising display; railway equipment; ships; yachts; motor cars; airplanes; theatrical production; settings; stage lighting; stage direction.

JULY 1935 NORMAN BEL GEDDES & GEORGE HOWE 47

Fig. 1.20

"A New and Significant Type of Partnership," *Architectural Record* (July 1935).

Fig. 1.21

Members of the Architectural Commission for the Century of Progress Exposition. Left to right: John Holabird, Arthur Brown, Jr., Paul Cret, Harvey Wiley Corbett, Ralph Walker, Edward Bennett, Raymond Hood and Hubert Burnham. From Louis Skidmore, “Planning and Planners.” *Architectural Forum* (July 1933).

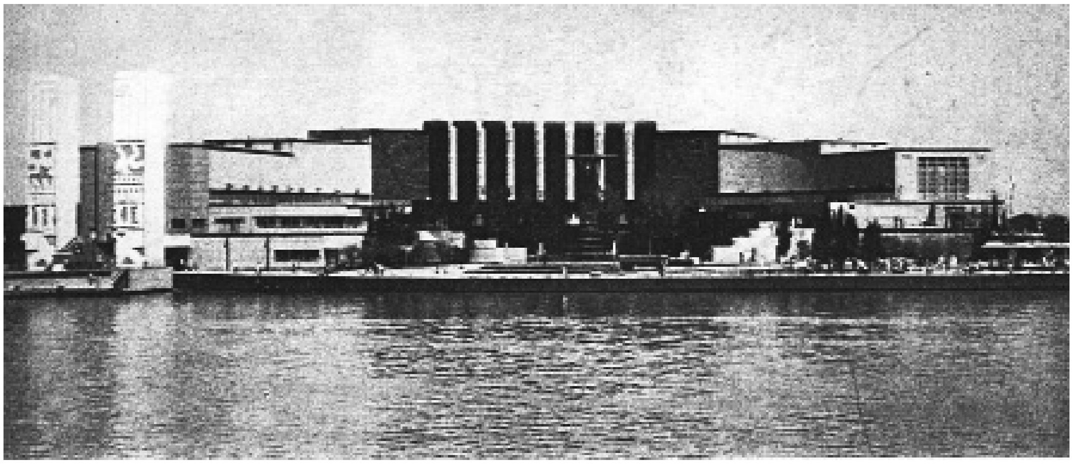


Fig. 1.22

The Electrical Group in the Century of Progress Exposition. Raymond Hood. From *Architectural Forum* (July 1933).

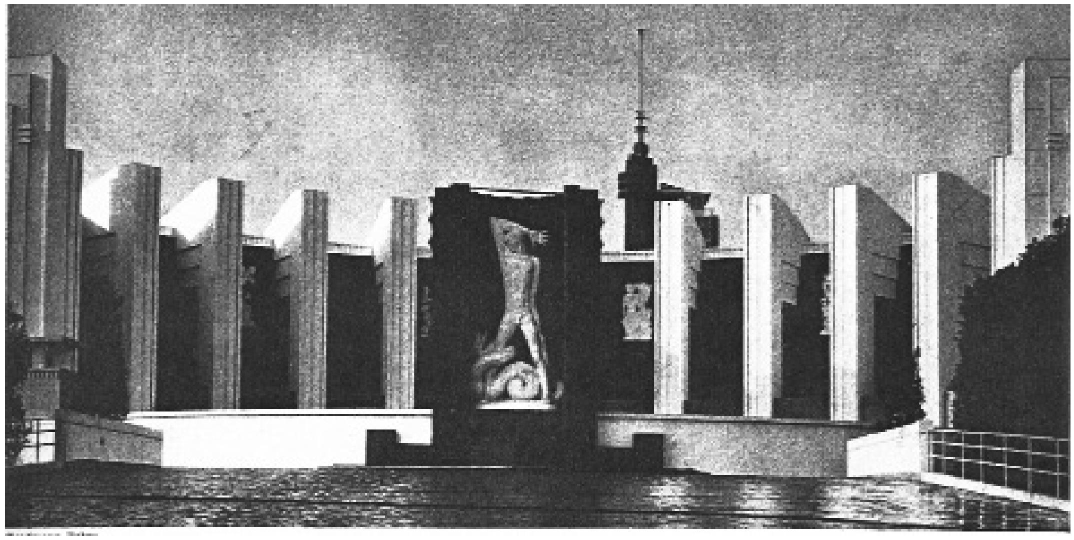


Fig. 1.23

Hall of Science in the Century of Progress Exposition. Paul Philippe Cret. From *Architectural Forum* (July 1933).

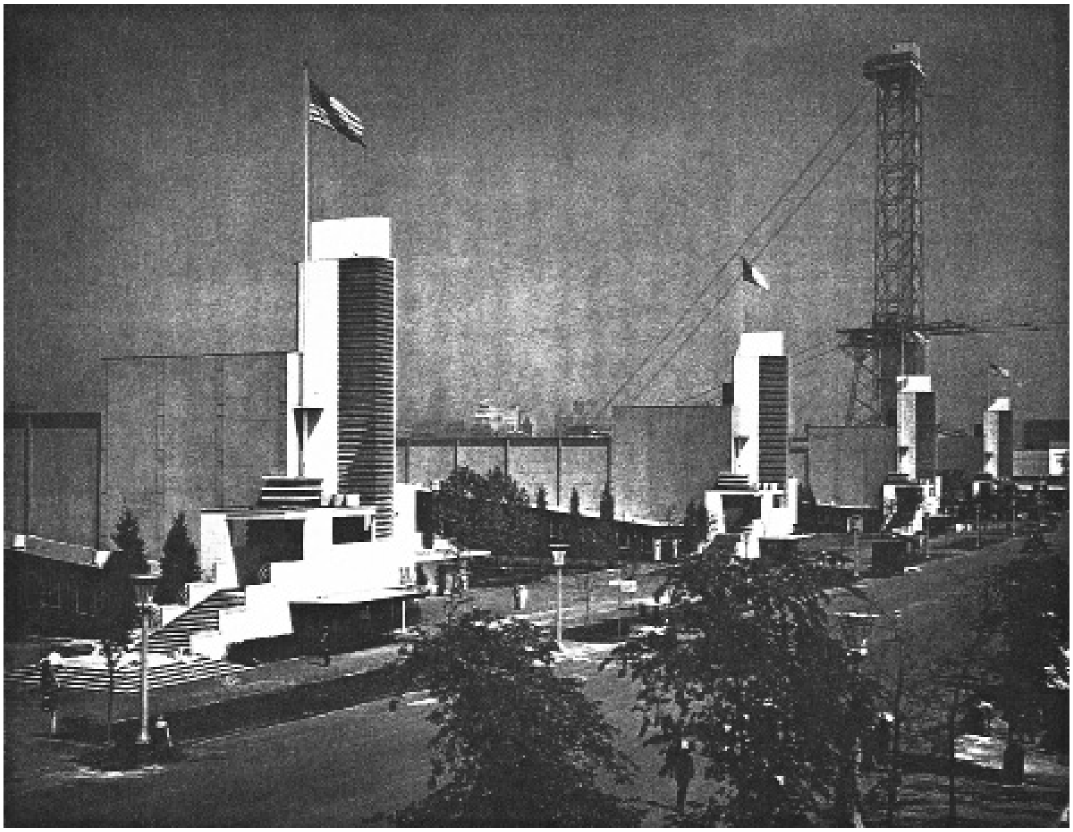


Fig. 1.24

The General Exhibits Group in the Century of Progress Exposition. Harvey Wiley Corbett. From *Architectural Forum* (July 1933).

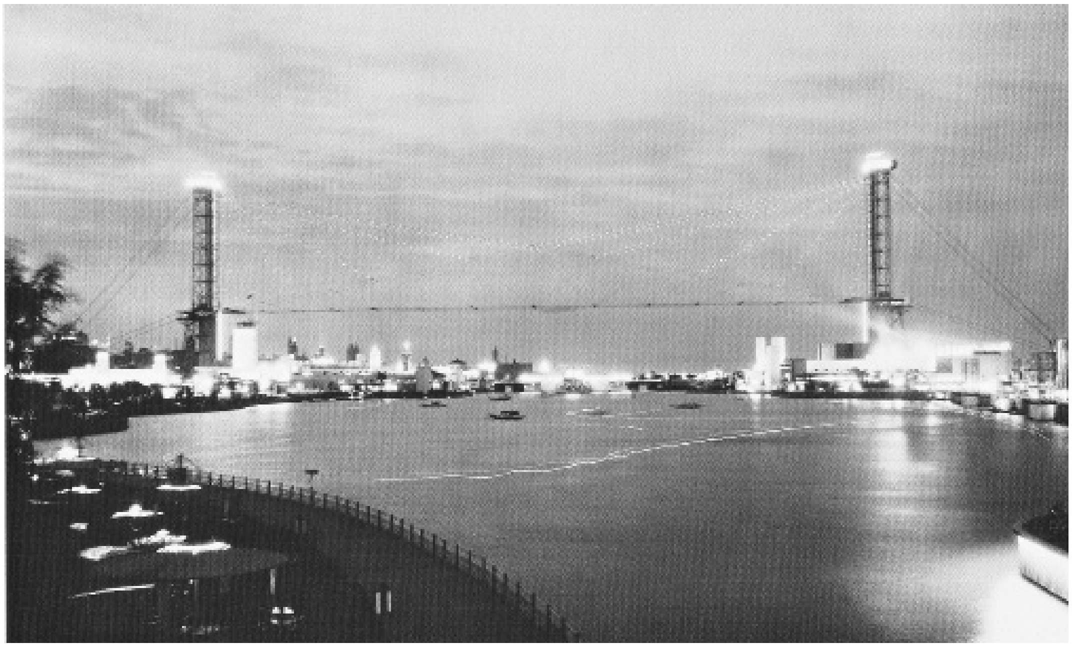


Fig. 1.25

The Sky Ride at the Century of Progress Exposition. From Laura Burd Schiavo, “Modern Design Goes Public: A Photo Essay,” *Designing Tomorrow: America’s World’s Fairs of the 1930s*. Eds. Robert W. Rydell and Laura Burd Schiavo. New Haven and London: Yale University Press, 2010.

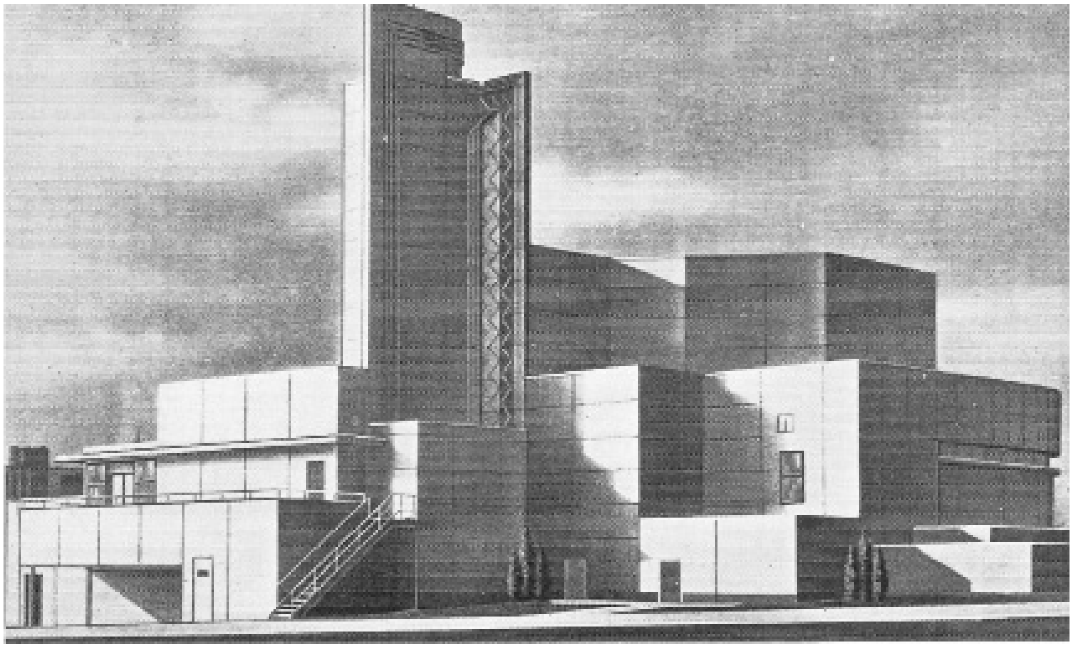


Fig. 1.26

Dairy Building at the Century of Progress Exposition. From Lisa D. Schrenk, *Building a Century of Progress: The Architecture of Chicago's 1933-34 World's Fair*. Minneapolis and London: University of Minnesota Press, 2007.

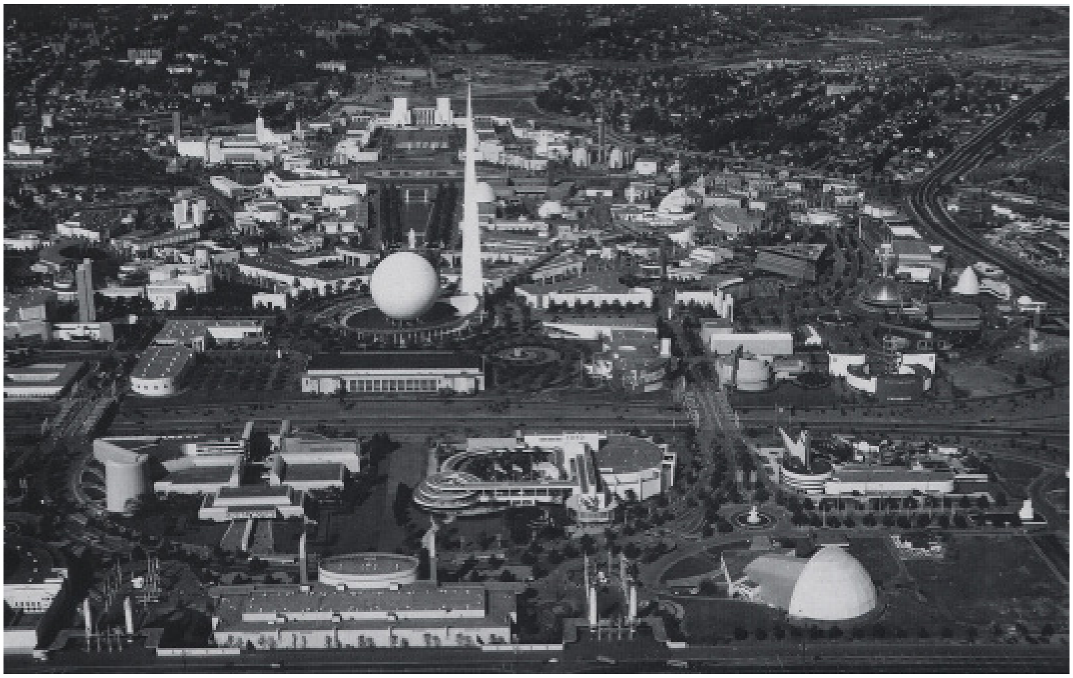


Fig. 1.27

New York World's Fair of 1939. From *The World of Tomorrow: The 1939 New York World's Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row, 1988.

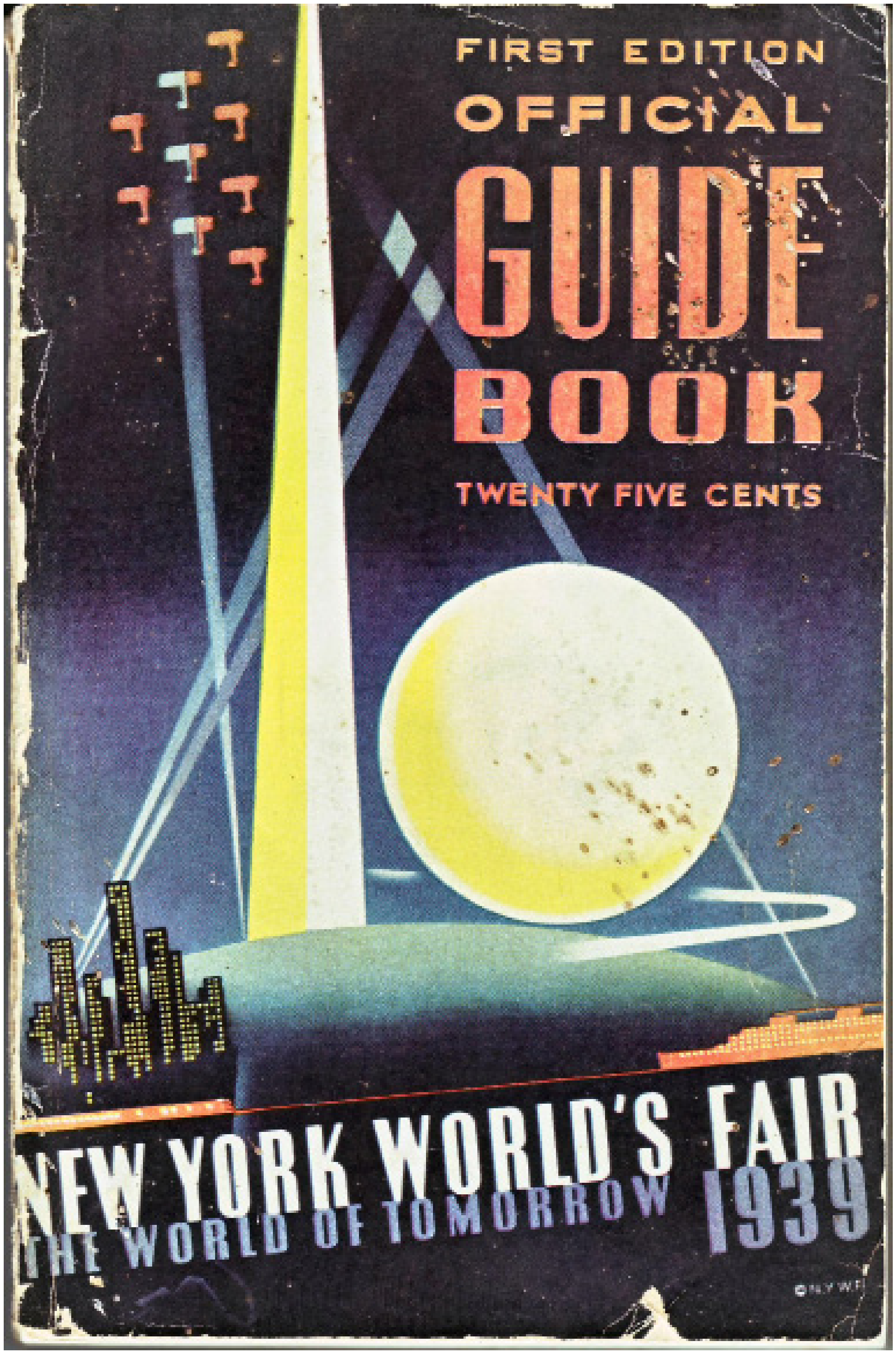


Fig. 1.28

Cover of the *Official Guide Book: New York World's Fair, 1939*. New York: Exposition Publications Inc., 1939.

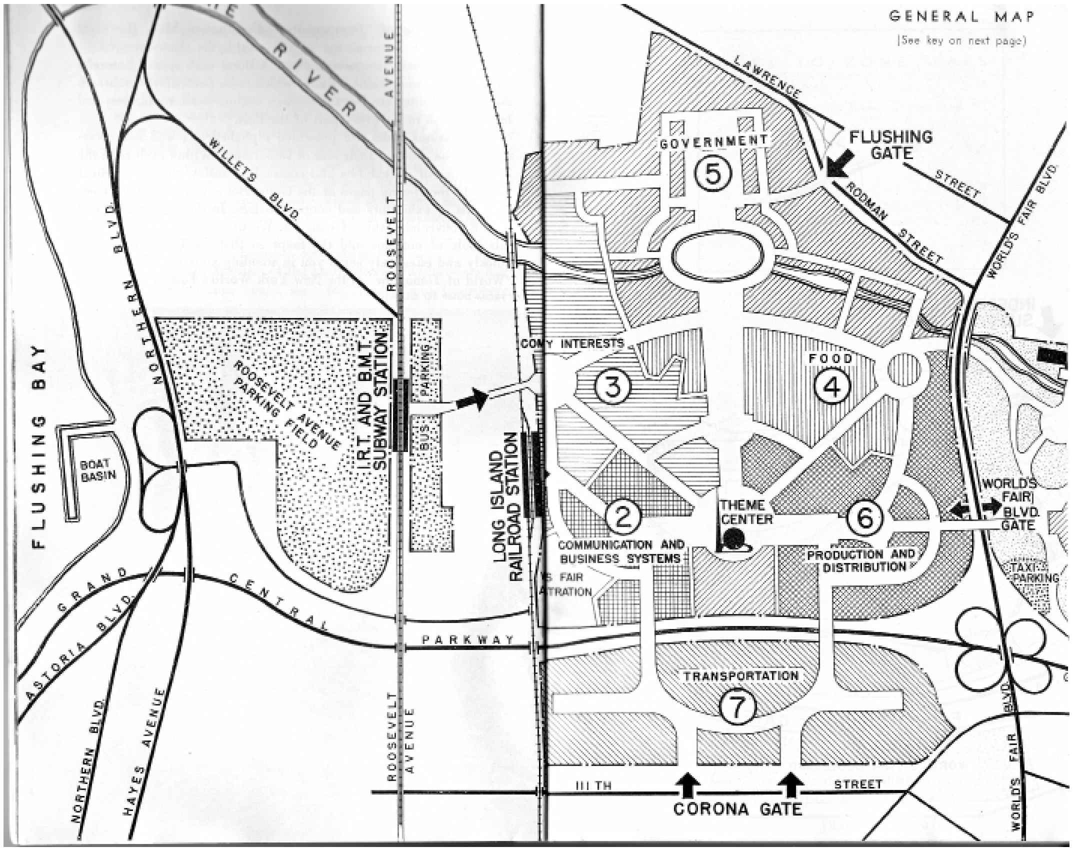


Fig. 1.29

General Map of the New York World's Fair of 1939. From the *Official Guide Book: New York World's Fair, 1939*. New York: Exposition Publications Inc., 1939.

Fig. 1.30

Trylon and Perisphere by Harrison & Fouilhoux. From *The World of Tomorrow: The 1939 New York World's Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row, 1988.

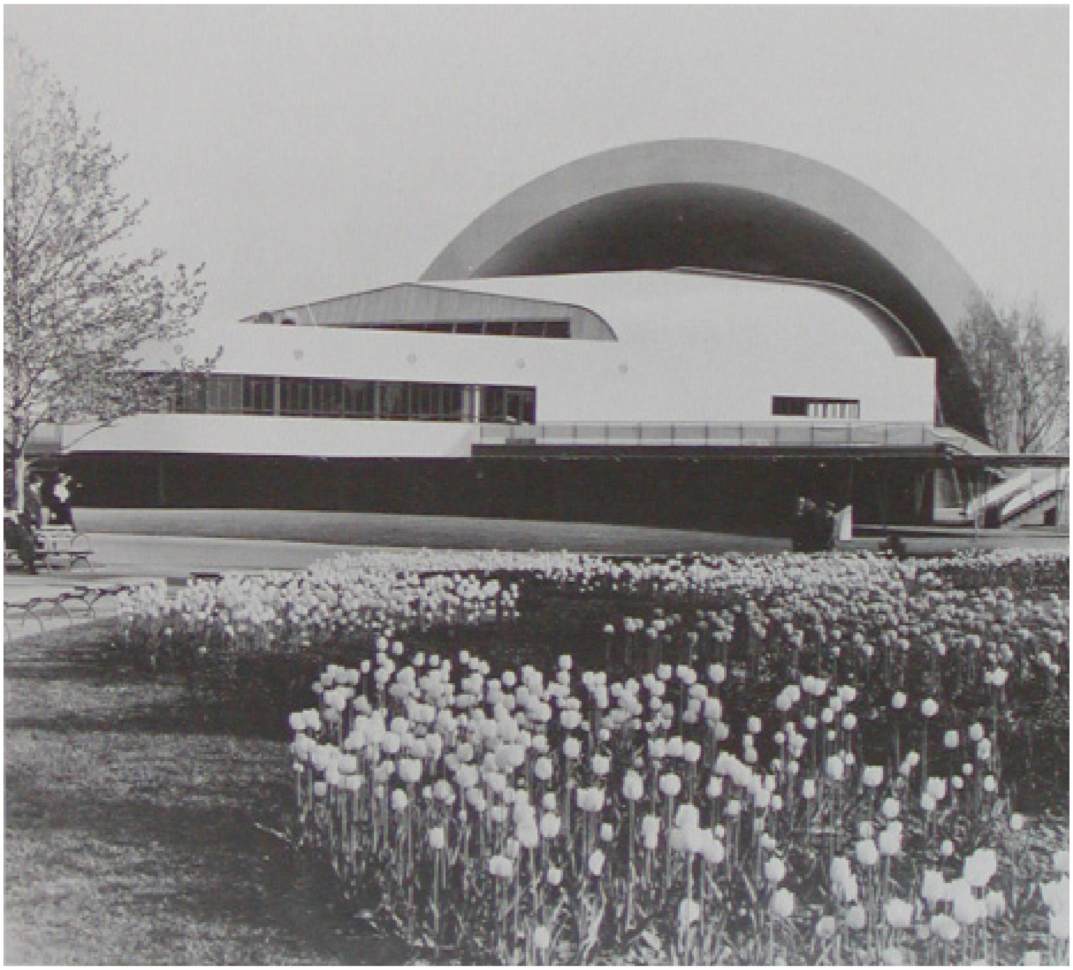


Fig. 1.31

Aviation Building by William Lescaze and J. Gordon Carr.

Fig. 1.32

Aviation Building by William Lescaze and J. Gordon Carr. From *The World of Tomorrow: The 1939 New York World's Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row, 1988.

Fig. 1.33

Marine Transportation Building by Ely Jacques Kahn and Muschenheim & Brounn. From *The World of Tomorrow: The 1939 New York World's Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row, 1988.

Fig. 1.34

National Cash Register Company Building by Ely Jacques Kahn, Walter Dorwin Teague and Harry Heybeck. From *Dawn of a New Day: The New York World's Fair, 1939/40*. Flushing, N.Y.: Queens Museum; New York University Press, 1980.

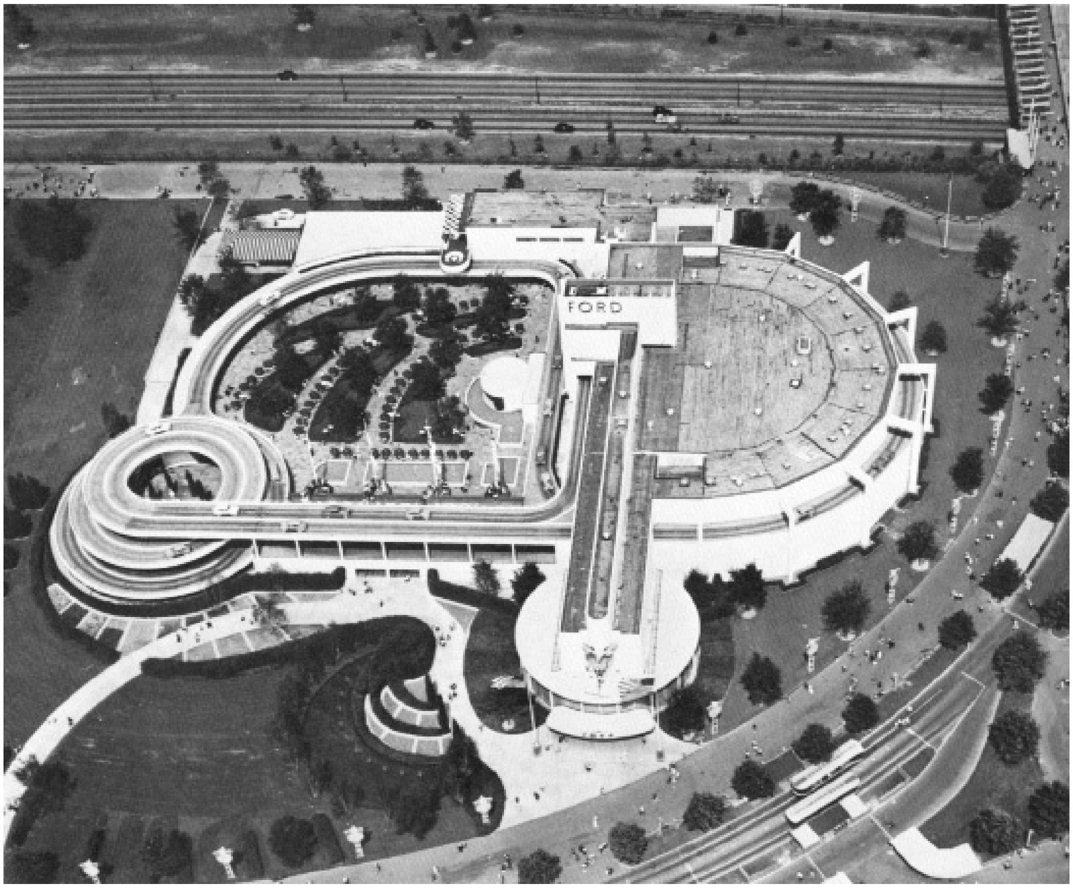


Fig. 1.35

Ford Motor Company Building by Albert Kahn and Walter Dorwin Teague. From *The World of Tomorrow: The 1939 New York World's Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row, 1988.

Fig. 1.36

General Motors Building by Albert Kahn and Norman Bel Geddes. From *The World of Tomorrow: The 1939 New York World's Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row, 1988.

Fig. 1.37

Democracity Exhibit by Henry Dreyfuss. Wurts Brothers Collection, National Building Museum/Museum of the City of New York.

Fig. 1.38

Detailed View of Democracity by Henry Dreyfuss. Wurts Brothers Collection, National Building Museum/Museum of the City of New York.

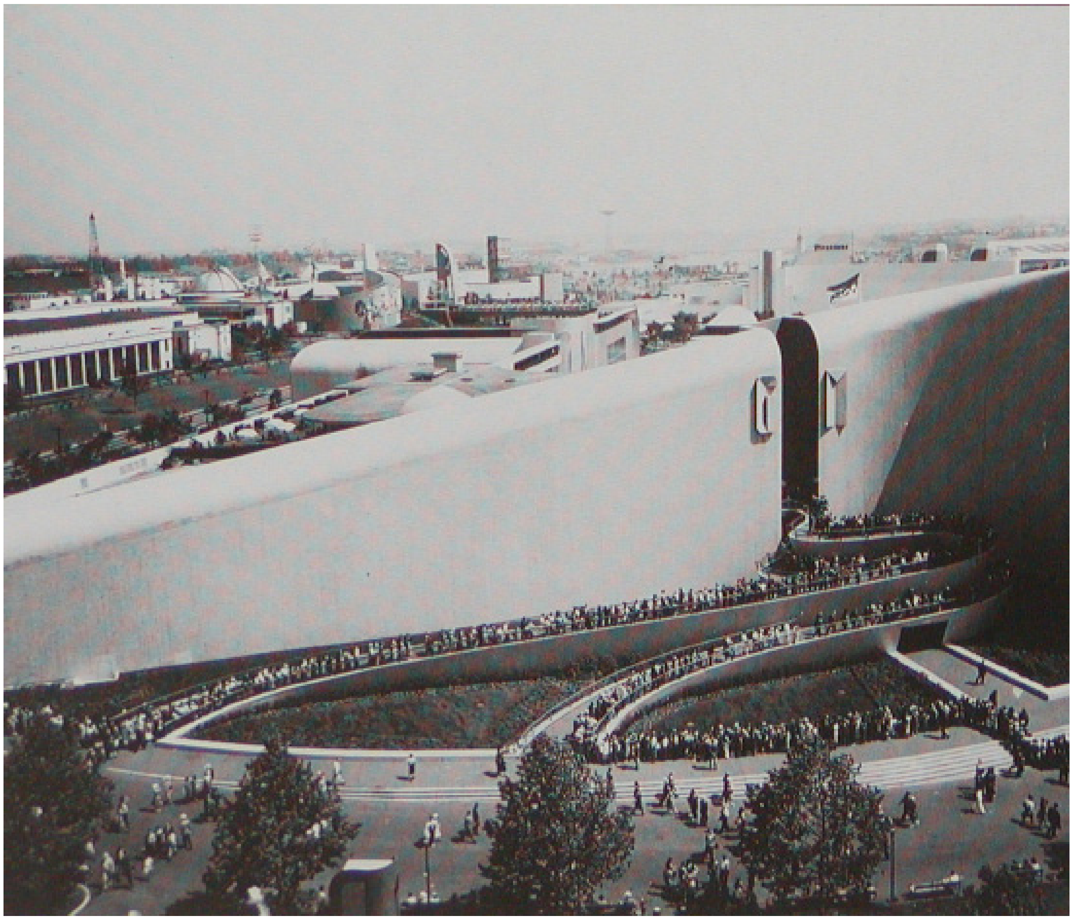


Fig. 1.39

The General Motors Highways and Horizons Exhibit by Albert Kahn and Norman Bel Geddes. From Donald J. Bush, *The Streamlined Decade*. New York: George Braziller, 1975.

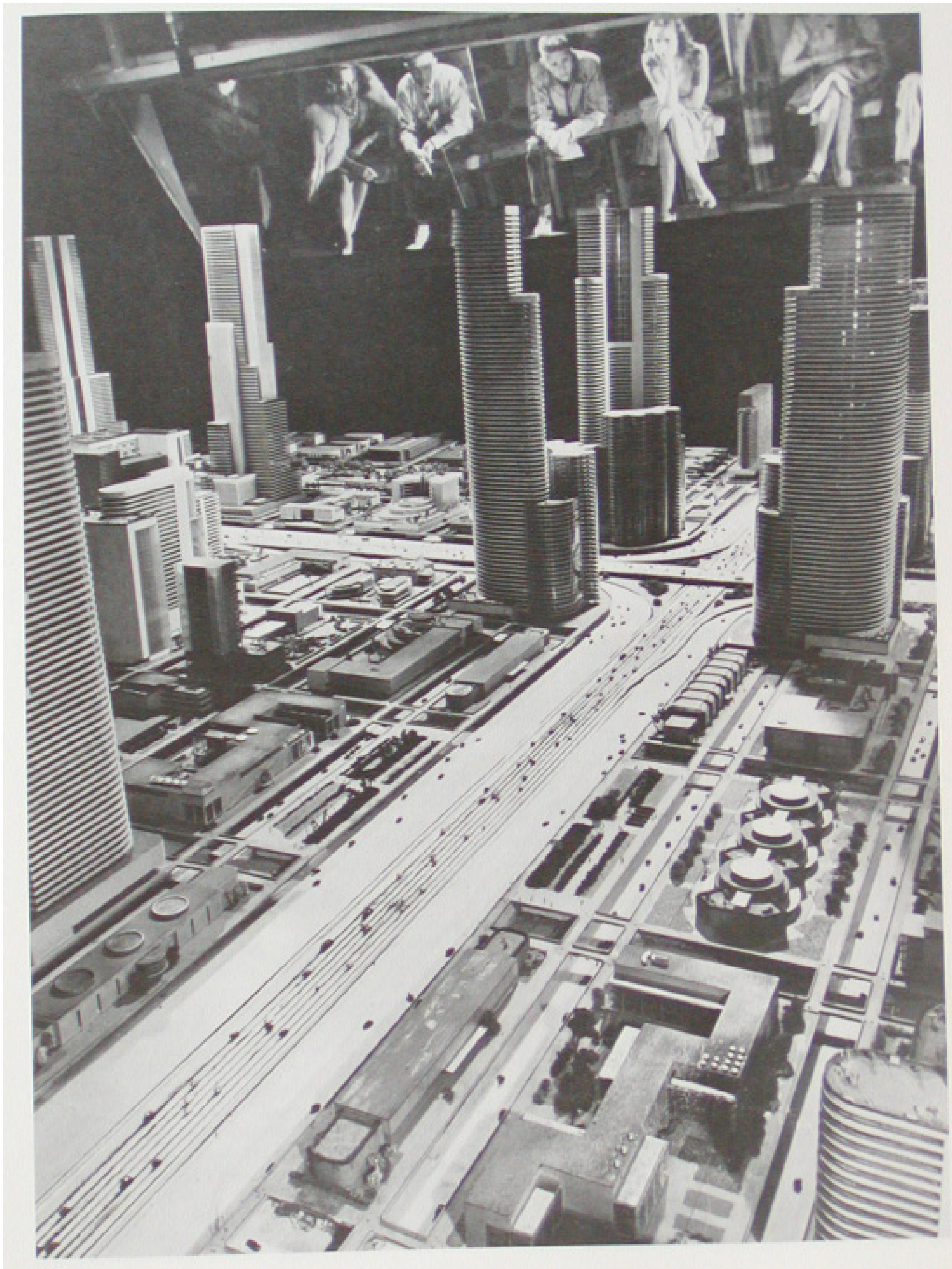


Fig. 1.40

Futurama by Norman Bel Geddes. From Jeffrey L. Meikle, *Twentieth Century Limited.* Philadelphia: Temple University Press, 1979.

Fig. 1.41

Children in the Futurama by Norman Bel Geddes. From Arthur J. Pulos, *American Design Ethic: A History of Industrial Design*. Cambridge, M.A.: MIT Press, 1983.

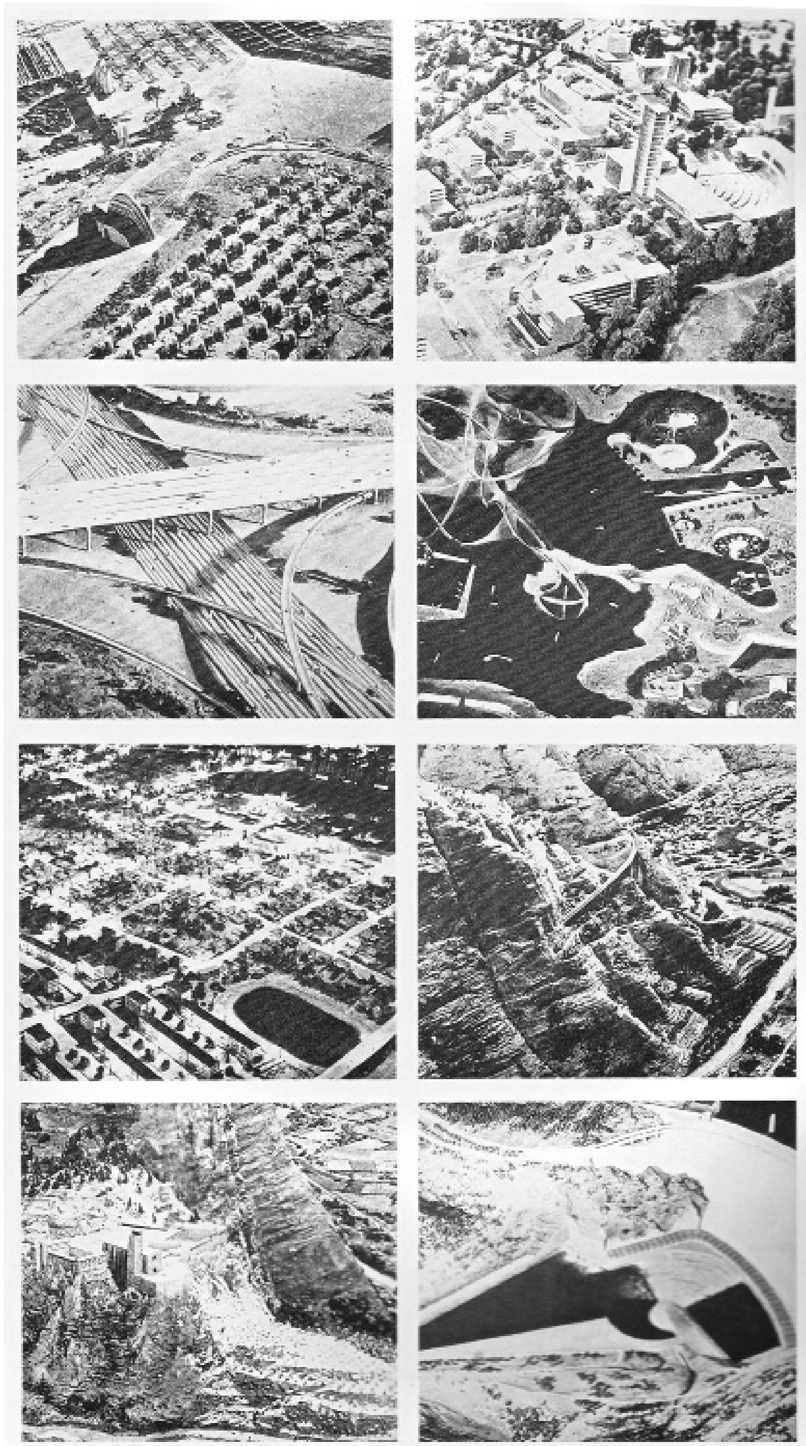


Fig. 1.42

Details of the Futurama. From *The World of Tomorrow: The 1939 New York World's Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row, 1988.

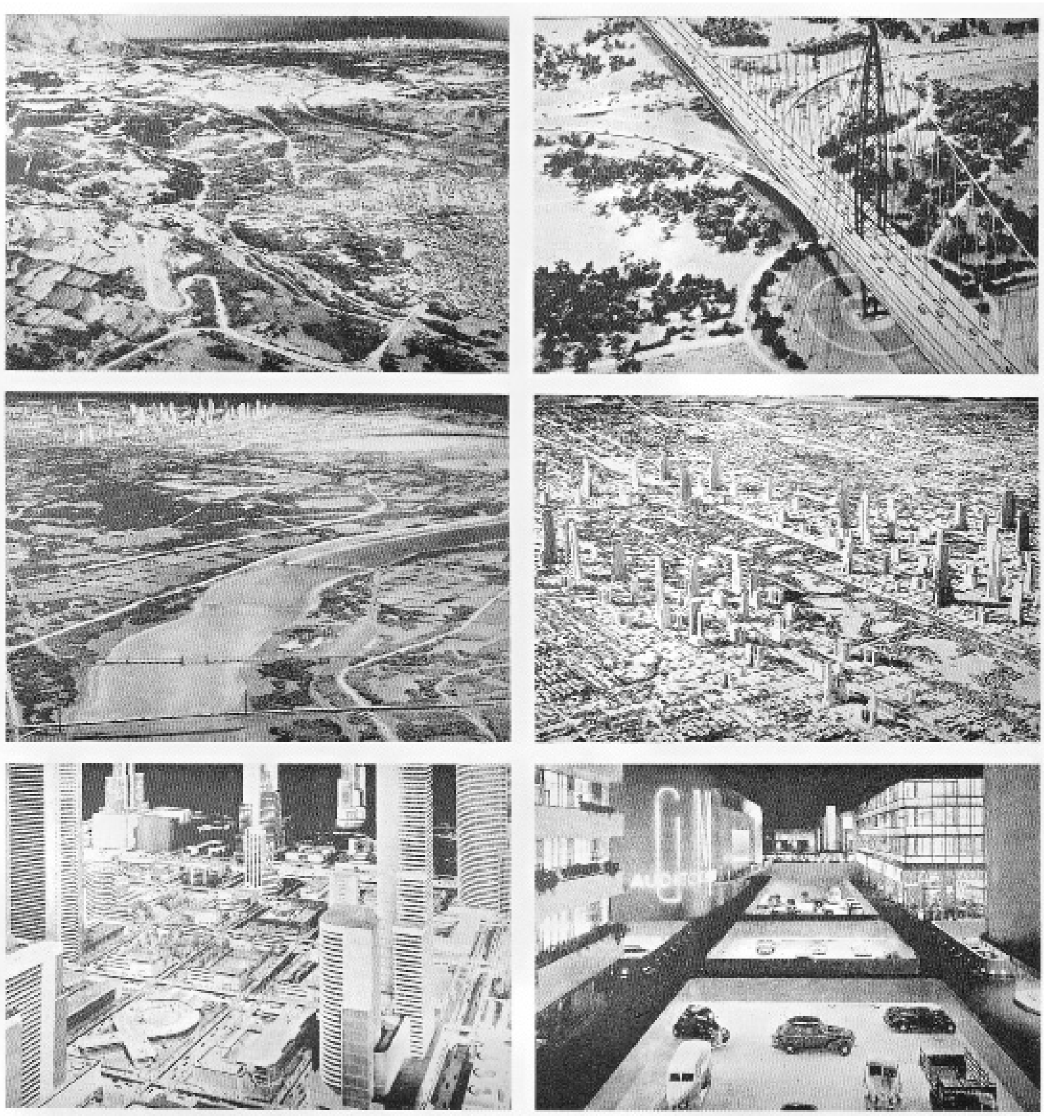


Fig. 1.43

Details of the Futurama. From *The World of Tomorrow: The 1939 New York World's Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row, 1988.

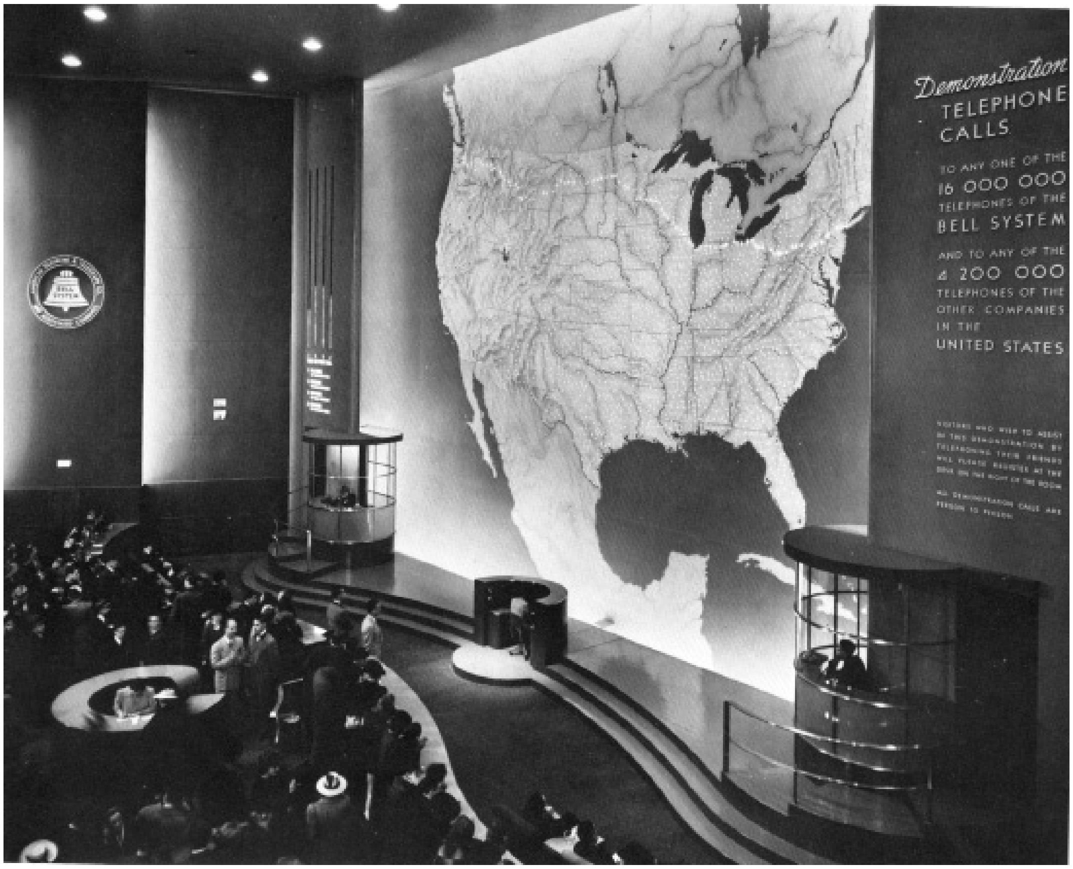


Fig. 1.44

The Demonstration Call Room in the AT&T Building by Henry Dreyfuss. From Richard Wurts and Stanley Appelbaum, *The New York World's Fair, 1939/1940 in 155 Photographs*. New York: Dover Publications, 1977.

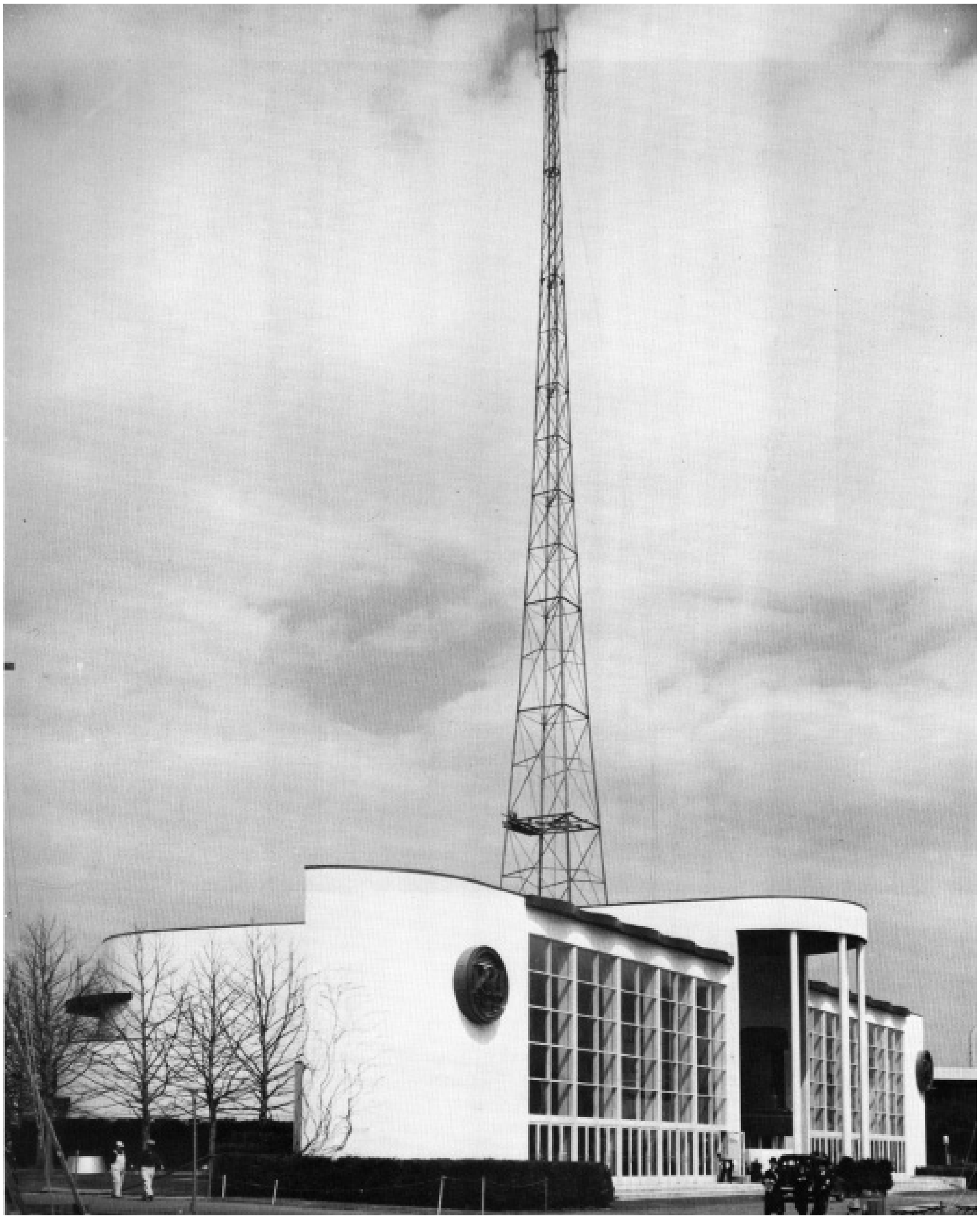


Fig. 1.45

The Radio Corporation of America (RCA) Building by Skidmore & Owings. Details of the Futurama. From *The World of Tomorrow: The 1939 New York World's Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row, 1988.

Fig. 1.46

The Main Hall of RCA the Exhibit by Skidmore & Owings. From *The World of Tomorrow: The 1939 New York World's Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row,

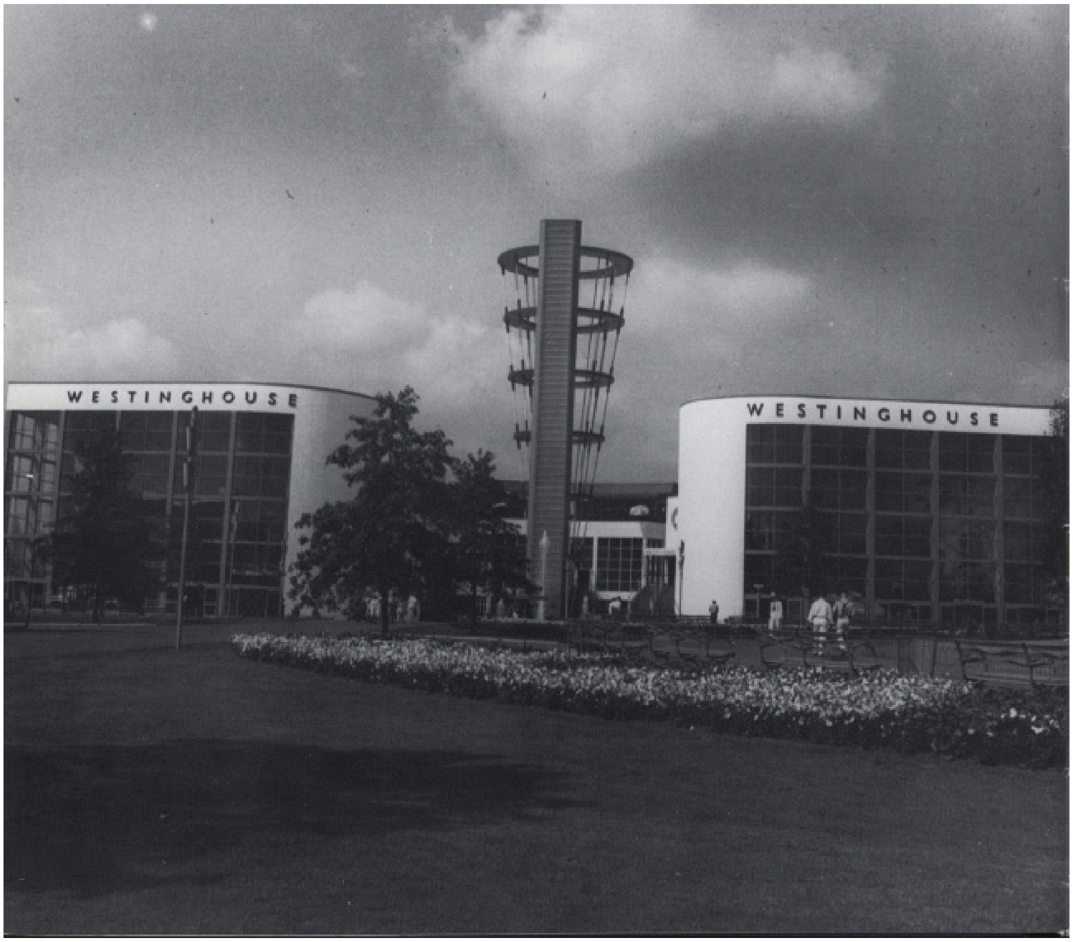


Fig. 1.47

The Westinghouse Building by Skidmore & Owings and John Moss. From *The World of Tomorrow: The 1939 New York World's Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row, 1988.

Fig. 1.48

“The Battle of the Centuries,” a dishwashing contest between Mrs. Drudge, who used her hands, and Mrs. Modern, who used a 1940 Westinghouse electric dishwasher. Designed by Skidmore & Owings and John Moss. From *The World of Tomorrow: The 1939 New York World’s Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row, 1988.

Fig. 1.49

Elektro, the Westinghouse Moto-Man. From *The World of Tomorrow: The 1939 New York World's Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row, 1988.

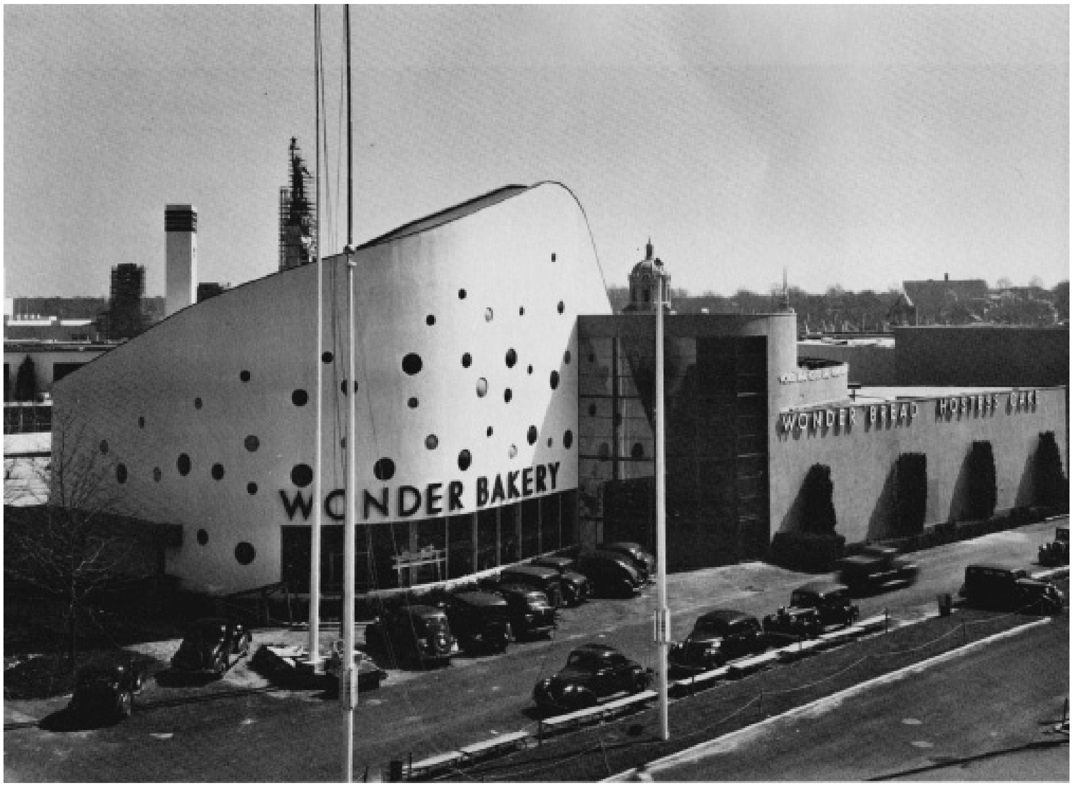


Fig. 1.50

The Continental Baking Company Building by Skidmore & Owings and John Moss. From Richard Wurts and Stanley Appelbaum, *The New York World's Fair, 1939/1940 in 155 Photographs*. New York: Dover Publications, 1977.

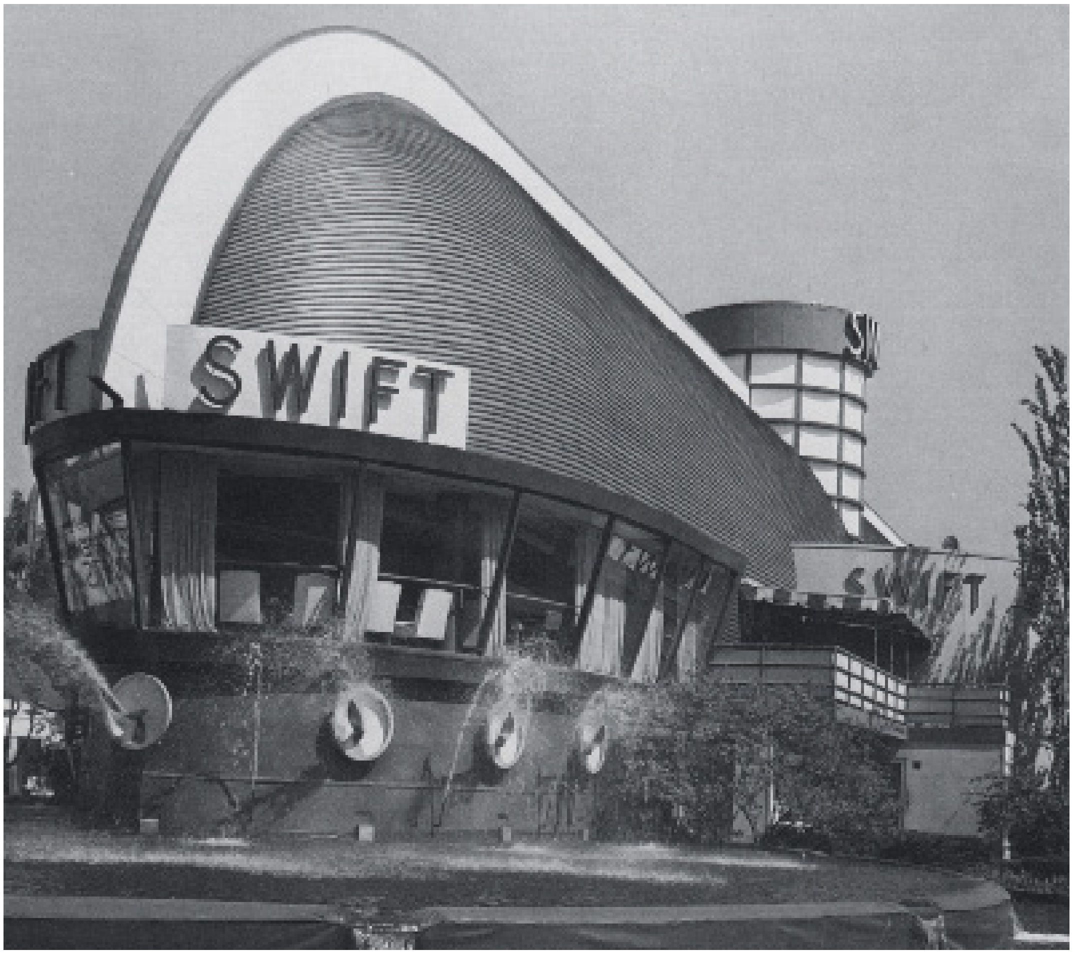
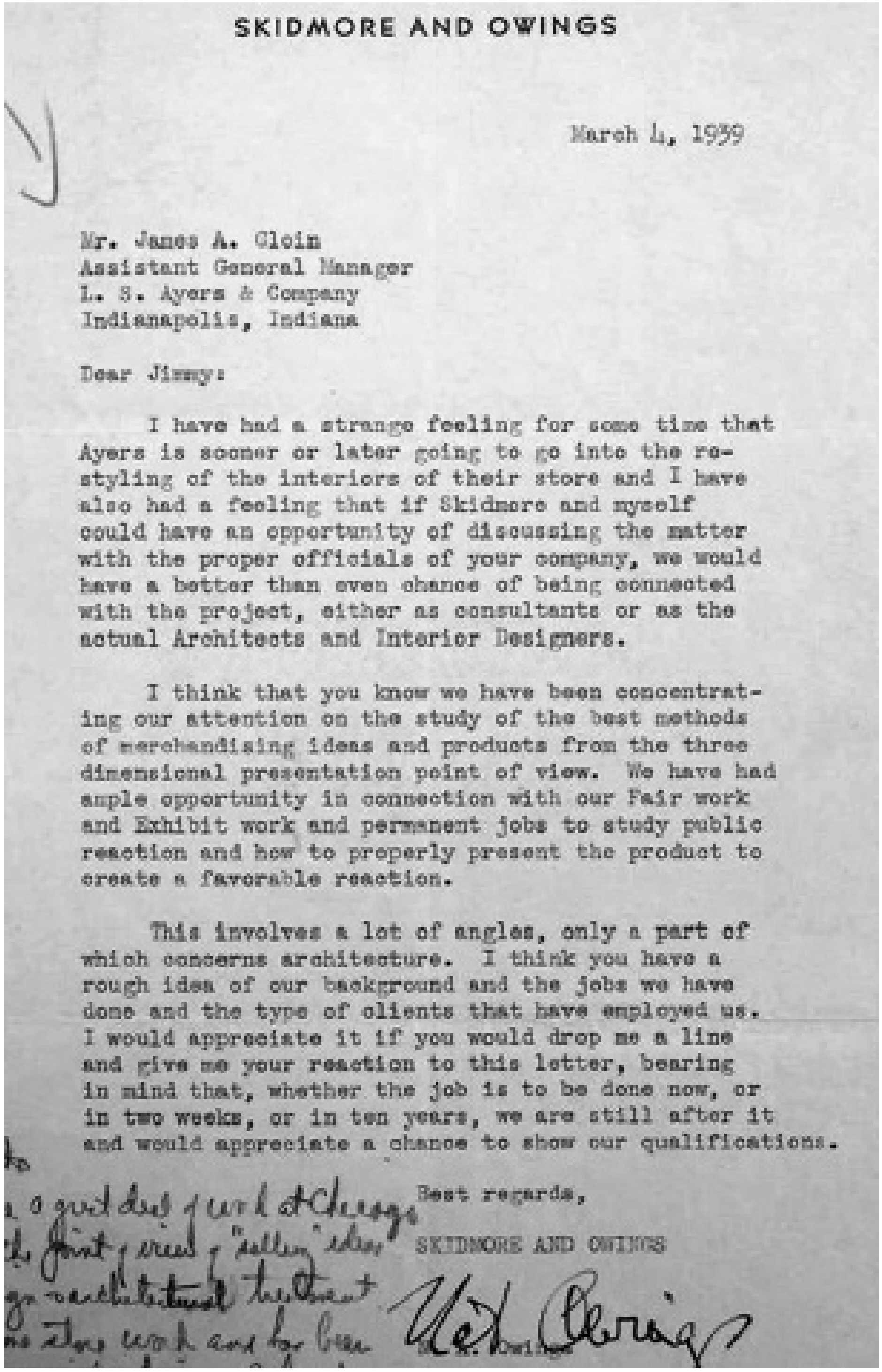


Fig. 1.51

The Swift and Company Building by Skidmore & Owings. From *The World of Tomorrow: The 1939 New York World's Fair*. Eds. Larry Zim, Mel Lerner and Herbert Rolfes. New York: Harper & Row, 1988.

Fig. 1.52

The Venezuela Pavilion by Skidmore & Owings and John Moss. From Carol Herselle Krinsky, Gordon Bunshaft of Skidmore, Owings & Merrill. American Monograph Series. Cambridge, M.A.: MIT Press, 1988.



SKIDMORE AND OWINGS

March 4, 1939

Mr. James A. Gloin
Assistant General Manager
L. S. Ayers & Company
Indianapolis, Indiana

Dear Jimmy:

I have had a strange feeling for some time that Ayers is sooner or later going to go into the re-styling of the interiors of their store and I have also had a feeling that if Skidmore and myself could have an opportunity of discussing the matter with the proper officials of your company, we would have a better than even chance of being connected with the project, either as consultants or as the actual Architects and Interior Designers.

I think that you know we have been concentrating our attention on the study of the best methods of merchandising ideas and products from the three dimensional presentation point of view. We have had ample opportunity in connection with our Fair work and Exhibit work and permanent jobs to study public reaction and how to properly present the product to create a favorable reaction.

This involves a lot of angles, only a part of which concerns architecture. I think you have a rough idea of our background and the jobs we have done and the type of clients that have employed us. I would appreciate it if you would drop me a line and give me your reaction to this letter, bearing in mind that, whether the job is to be done now, or in two weeks, or in ten years, we are still after it and would appreciate a chance to show our qualifications.

Best regards,

SKIDMORE AND OWINGS

Nat Owings

N. A. Owings

Fig. 1.53

Letter to James A. Gloin, Assistant General Manager of L. S. Ayres & Company by Nathaniel A. Owings. Nathaniel A. Owings Papers. Library of Congress.

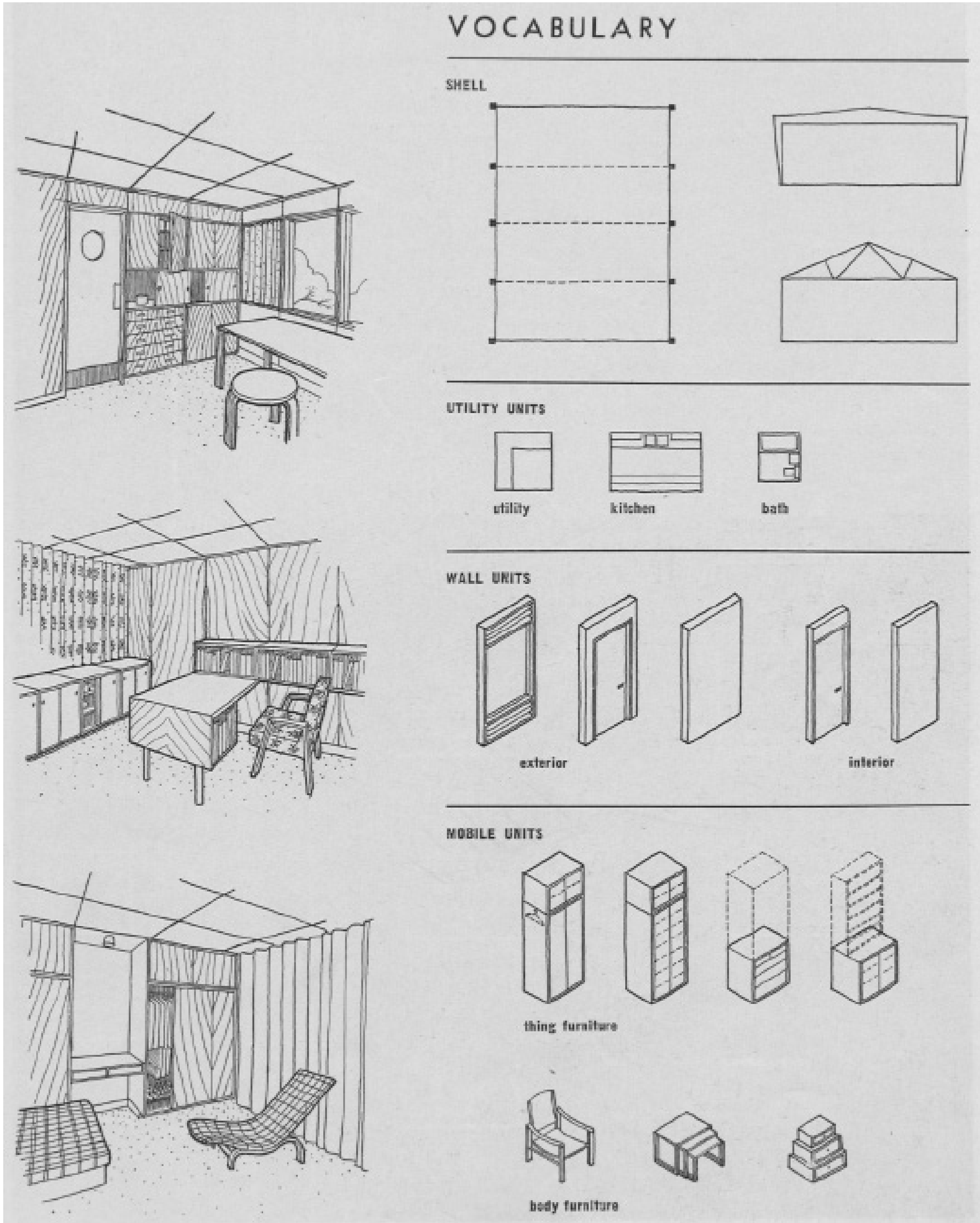


Fig. 2.1

Vocabulary. From Skidmore, Owings & Merrill, “Flexible Space,” *Architectural Forum* (September 1942).

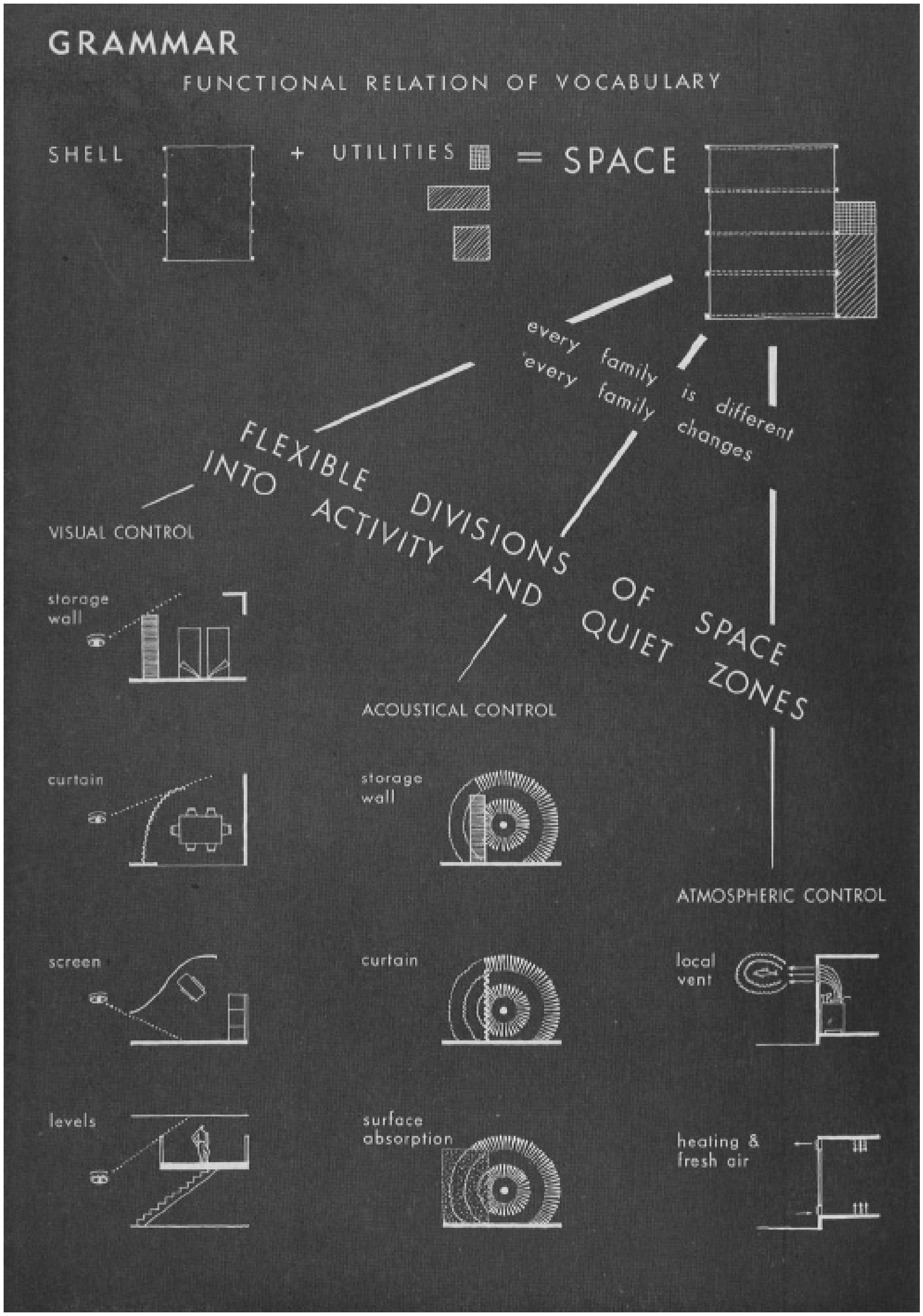


Fig. 2.2

Grammar. From Skidmore, Owings & Merrill, "Flexible Space," *Architectural Forum* (September 1942).

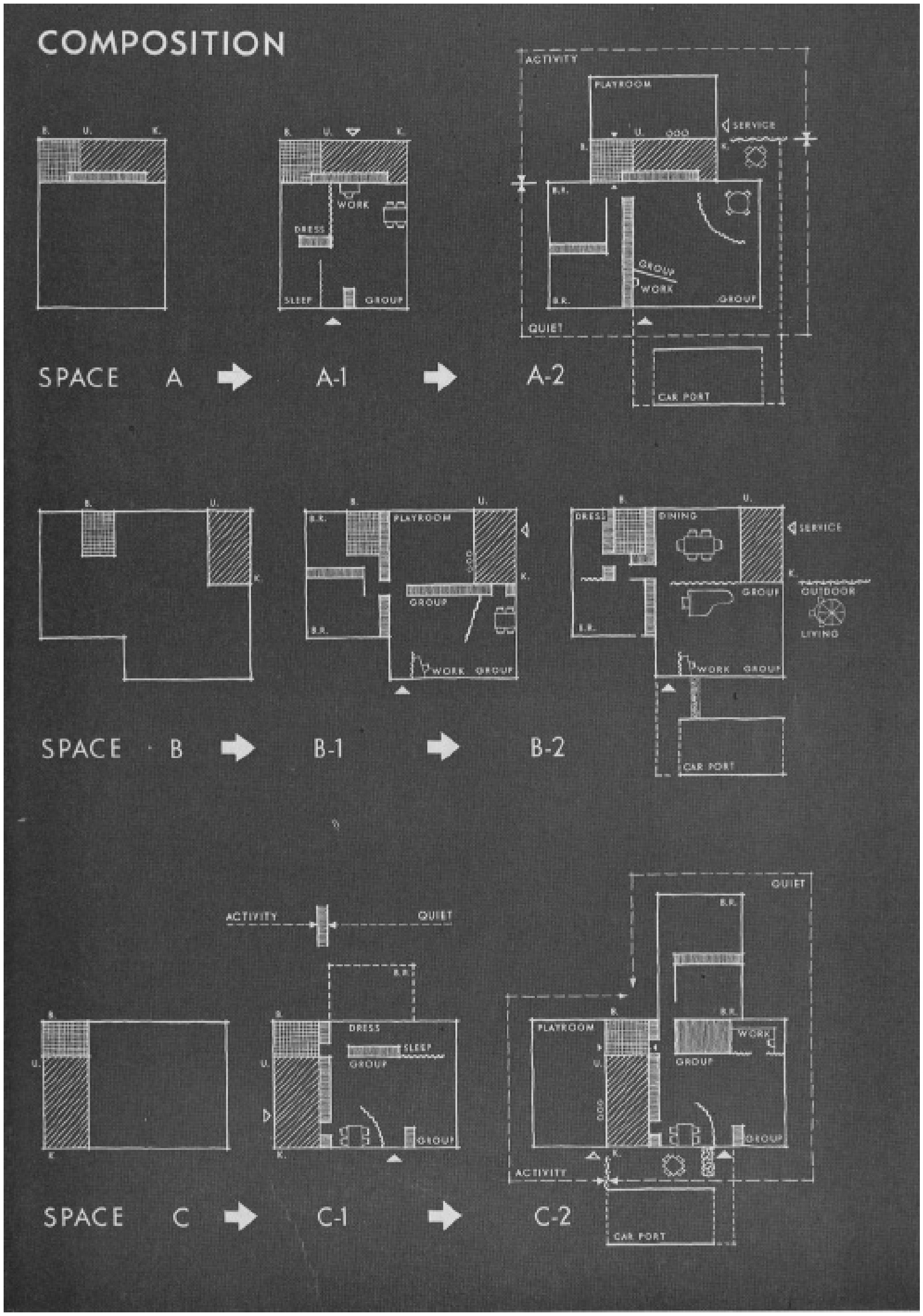


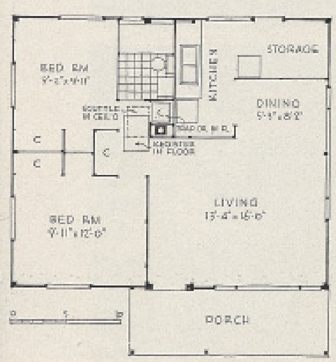
Fig. 2.3

Composition. From Skidmore, Owings & Merrill, "Flexible Space," *Architectural Forum* (September 1942).

Photo by Orville K. Blake

JOHN B. PIERCE FOUNDATION, Robert L. Davison, Director of Housing Research

SKIDMORE, OWINGS & MERRILL, Consultant Architects



MOST RECENT of the experimental, low-cost houses developed by the John B. Pierce Foundation is this "skeleton frame and curtain wall" house built by the Stansbury Corporation near Baltimore, Md. Two elements are of special news interest: 1. The structural system. 2. A rationalized construction procedure which assigns items to the shop or the field according to where they are most economically handled; yet which does not conflict with existing craft organizations. Such operations as sizing, notching, etc., are handled in the shop or mill; actual assembly of elements is made a field operation.

As in previous houses researched by the Pierce Foundation (AR 1/34; 8/35; 10/36 and 9/39), plan elements, materials and construction methods were determined only after exhaustive pre-analysis and test, with no interest in or bias in favor of any particular material, equipment or system per se.

Detailing of the house for large-scale production required the development of an entire new type of drawing, combining architectural, structural and shop drawings, specifications and erection manual (see next page).

MAY 1941 63

Fig. 2.4

Experimental House No.2. From "John. B. Pierce Foundation, Robert L. Davison, Director of Housing Research and Skidmore, Owings & Merrill, Consultant Architects." *Architectural Record* (May 1941).

Fig. 2.5

Typical Erection Schedule of Experimental House No.2. From John B. Pierce Foundation, Consulting Architects Skidmore, Owings & Merrill, and Supervisor J. Walter Severinghaus. *A Design for Living: The Low Cost Electrified Home*. New York: The John B. Pierce Foundation, 1941.

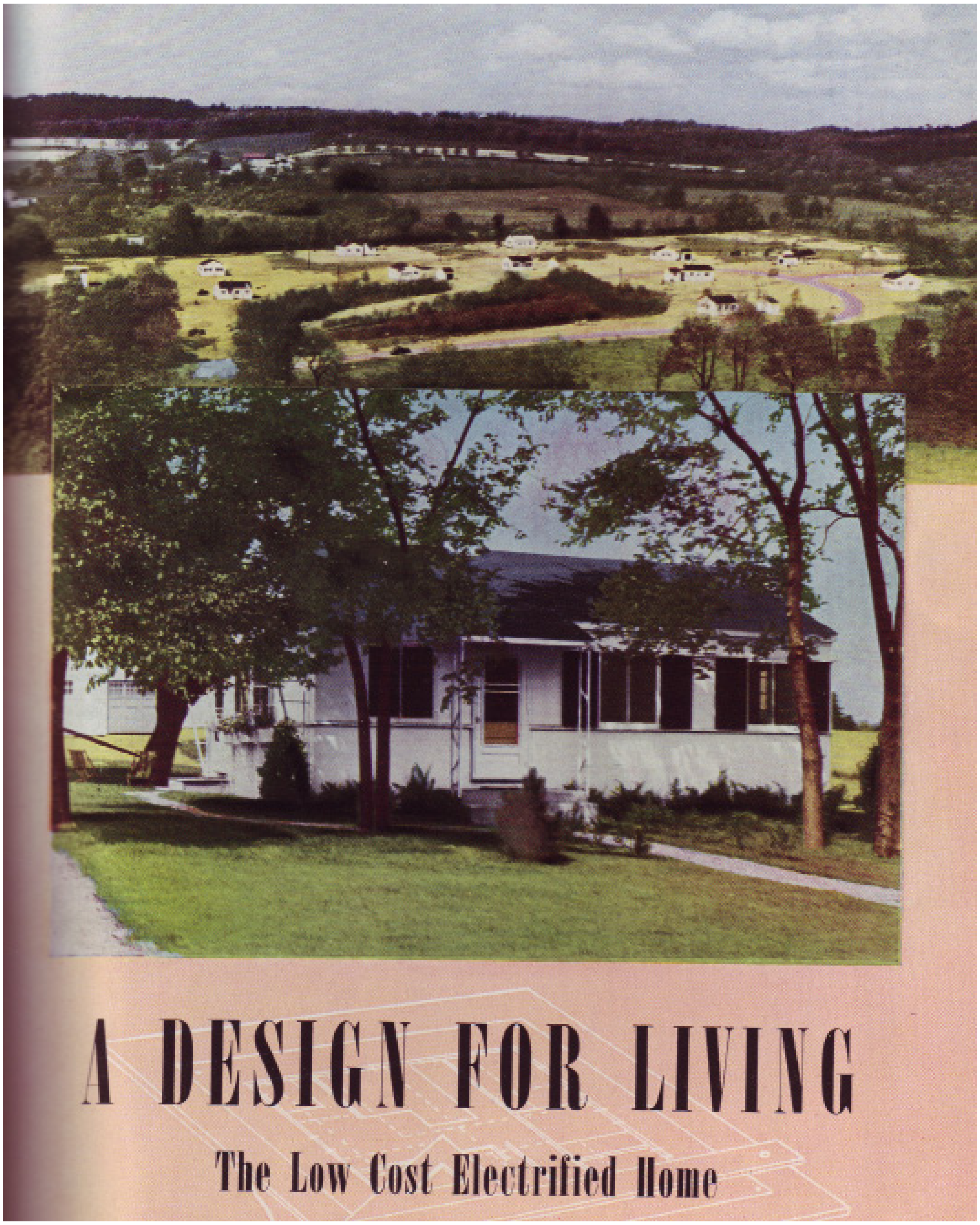


Fig. 2.6

Experimental House No.2. Cover of *A Design for Living: The Low Cost Electrified Home*. New York: The John B. Pierce Foundation, 1941.

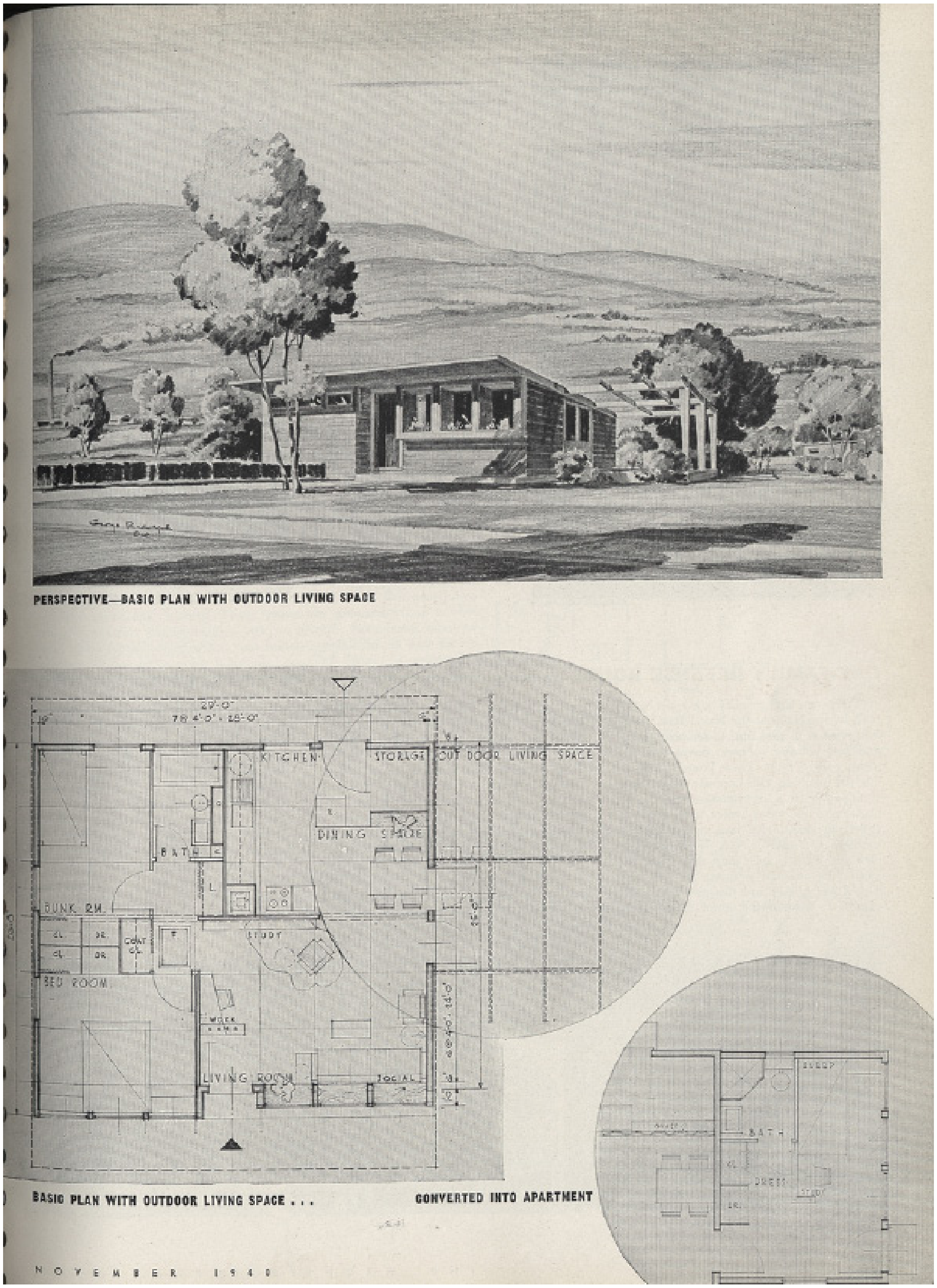
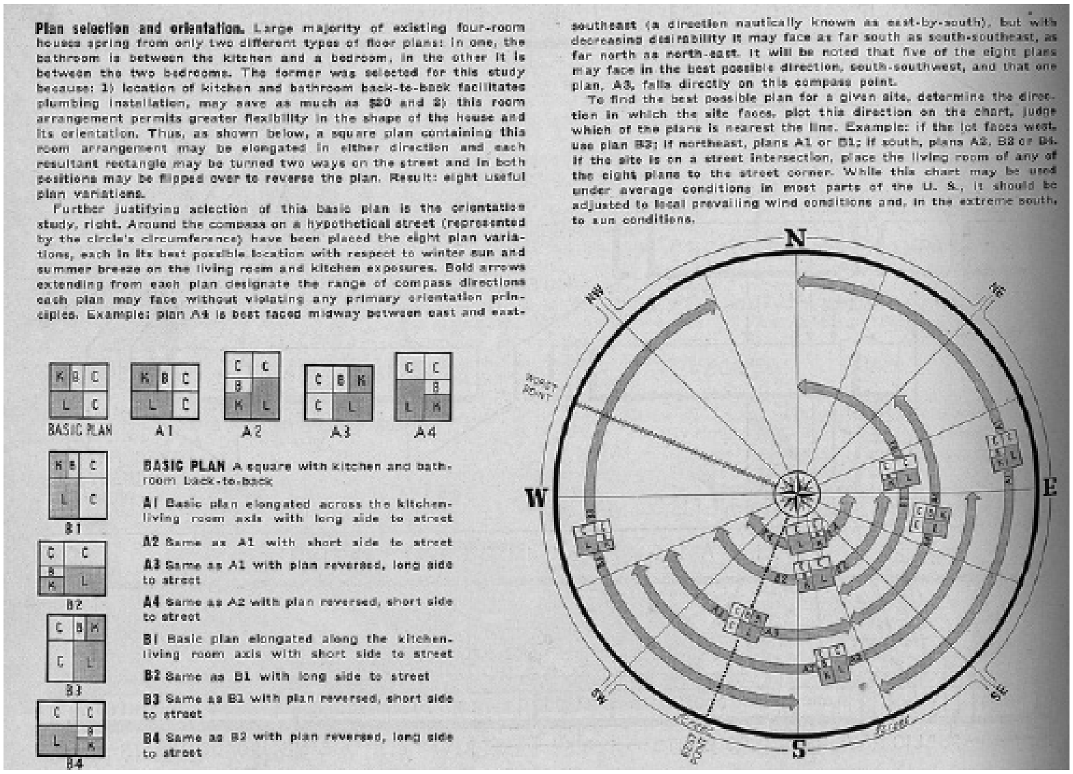


Fig. 2.7

"The *Architectural Forum* Defense House by Skidmore, Owings & Merrill, Architects." *Architectural Forum* (November 1940).



Plan selection and orientation. Large majority of existing four-room houses spring from only two different types of floor plans: in one, the bathroom is between the kitchen and a bedroom, in the other it is between the two bedrooms. The former was selected for this study because: 1) location of kitchen and bathroom back-to-back facilitates plumbing installation, may save as much as $20 and 2) this room arrangement permits greater flexibility in the shape of the house and its orientation. Thus, as shown below, a square plan containing this room arrangement may be elongated in either direction and each resultant rectangle may be turned two ways on the street and in both positions may be flipped over to reverse the plan. Result: eight useful plan variations.

Further justifying selection of this basic plan is the orientation study, right. Around the compass on a hypothetical street (represented by the circle's circumference) have been placed the eight plan variations, each in its best possible location with respect to winter sun and summer breeze on the living room and kitchen exposures. Bold arrows extending from each plan designate the range of compass directions each plan may face without violating any primary orientation principles. Example: plan A4 is best faced midway between east and east-southeast (a direction nautically known as east-by-south), but with decreasing desirability it may face as far south as south-southeast, as far north as north-east. It will be noted that five of the eight plans may face in the best possible direction, south-southwest, and that one plan, A3, falls directly on this compass point.

To find the best possible plan for a given site, determine the direction in which the site faces, plot this direction on the chart, judge which of the plans is nearest the line. Example: if the lot faces west, use plan B2; if northeast, plans A1 or B1; if south, plans A2, B3 or B4. If the site is on a street intersection, place the living room of any of the eight plans to the street corner. While this chart may be used under average conditions in most parts of the U. S., it should be adjusted to local prevailing wind conditions and, in the extreme south, to sun conditions.

BASIC PLAN A square with kitchen and bathroom back-to-back

A1 Basic plan elongated across the kitchen-living room axis with long side to street

A2 Same as A1 with short side to street

A3 Same as A1 with plan reversed, long side to street

A4 Same as A2 with plan reversed, short side to street

B1 Basic plan elongated along the kitchen-living room axis with short side to street

B2 Same as B1 with long side to street

B3 Same as B1 with plan reversed, short side to street

B4 Same as B2 with plan reversed, long side to street

Fig. 2.8

Plan Selection and Orientation Diagram. From “The *Architectural Forum* Defense House by Skidmore, Owings & Merrill, Architects.” *Architectural Forum* (November 1940).

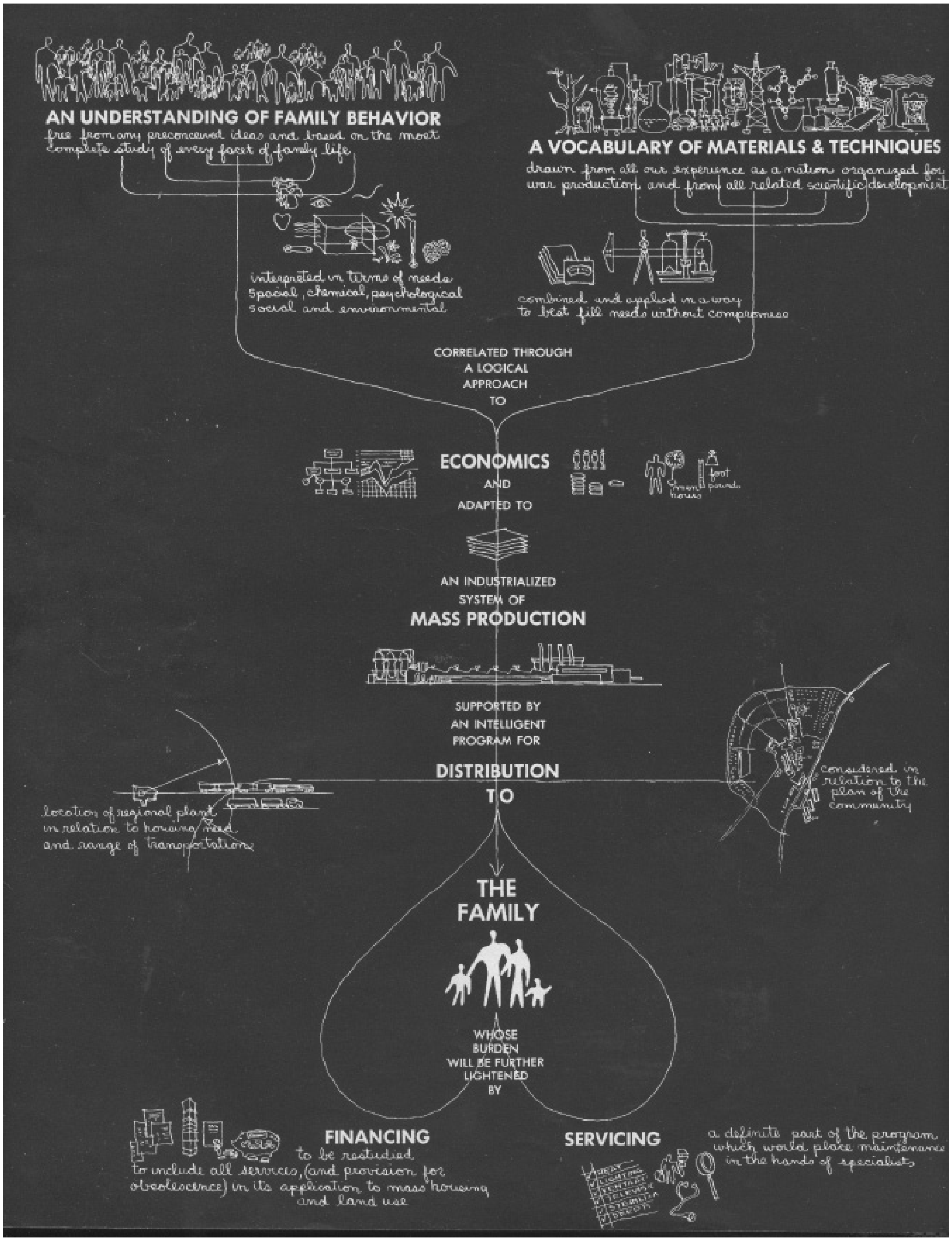


Fig. 2.9

Chart. Charles Eames, *Arts & Architecture* (July 1944).

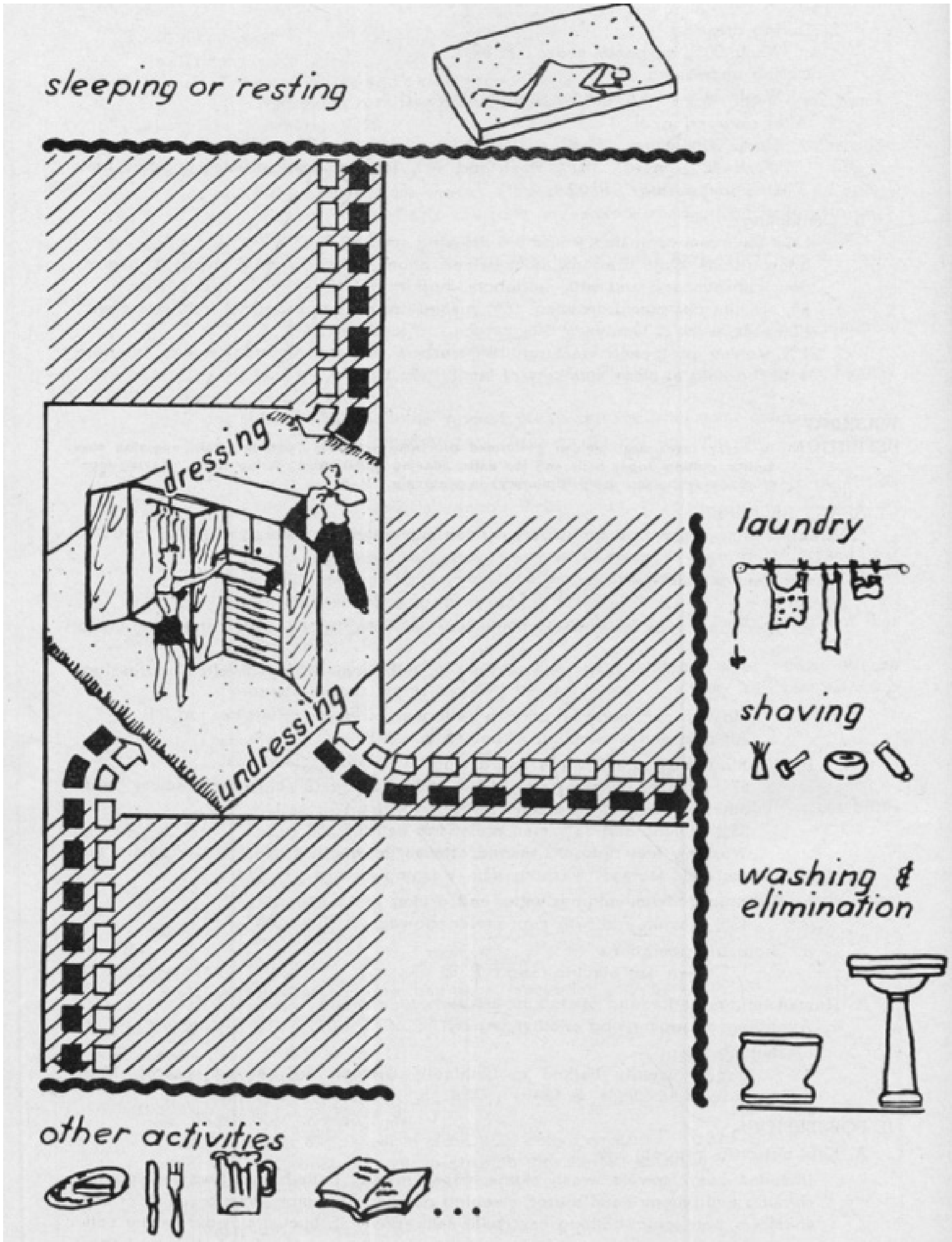


Fig. 2.10

Activity Research. Milton Blum and Beatrice Candee, *Family Behavior, Attitudes and Possessions*. New York: The John B. Pierce Foundation, 1944.

POSING THE MODEL
Camera set for overhead shot

TESTING THE NEW PHOTOGRAPHIC METHOD IN SMALL SCALE

As the plan called for a set-up of unusually large dimensions, it was first tested in small scale.

Diagonal action had proved the most difficult to measure in previous experiments. For this reason it was used to test the new technic. A small puppet walked diagonally across a miniature stage and each element of the motion was photographed—top, front and side.

The pictures were enlarged to make the figure 1/10 human size and from these prints two different types of models were made.

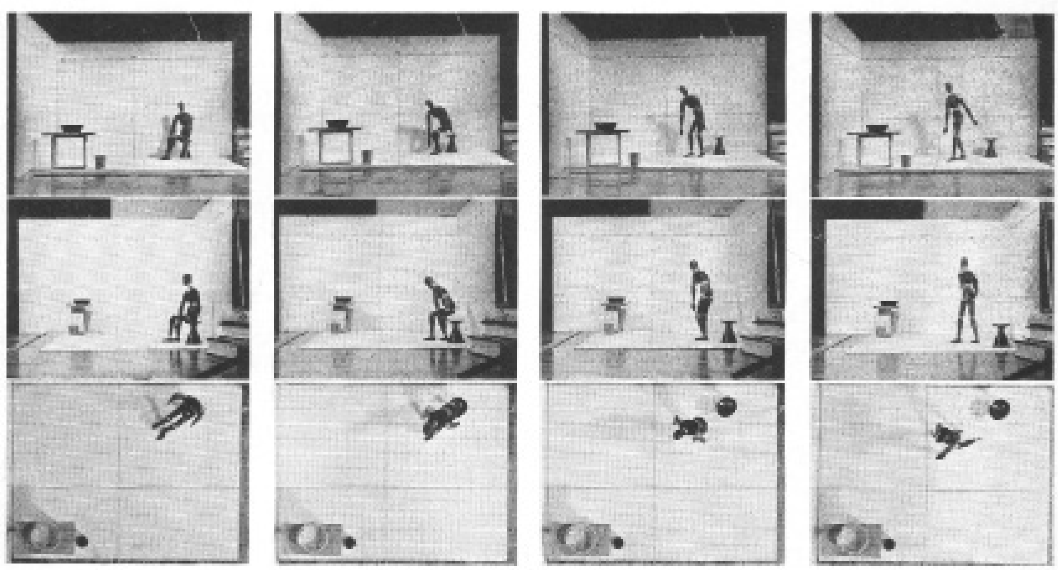


Fig. 2.11

Testing the New Photographic Method in Small Scale (A). Jane Callaghan and Catherine Palmer, *Measuring Space and Motion*. New York: The John B. Pierce Foundation, 1944.

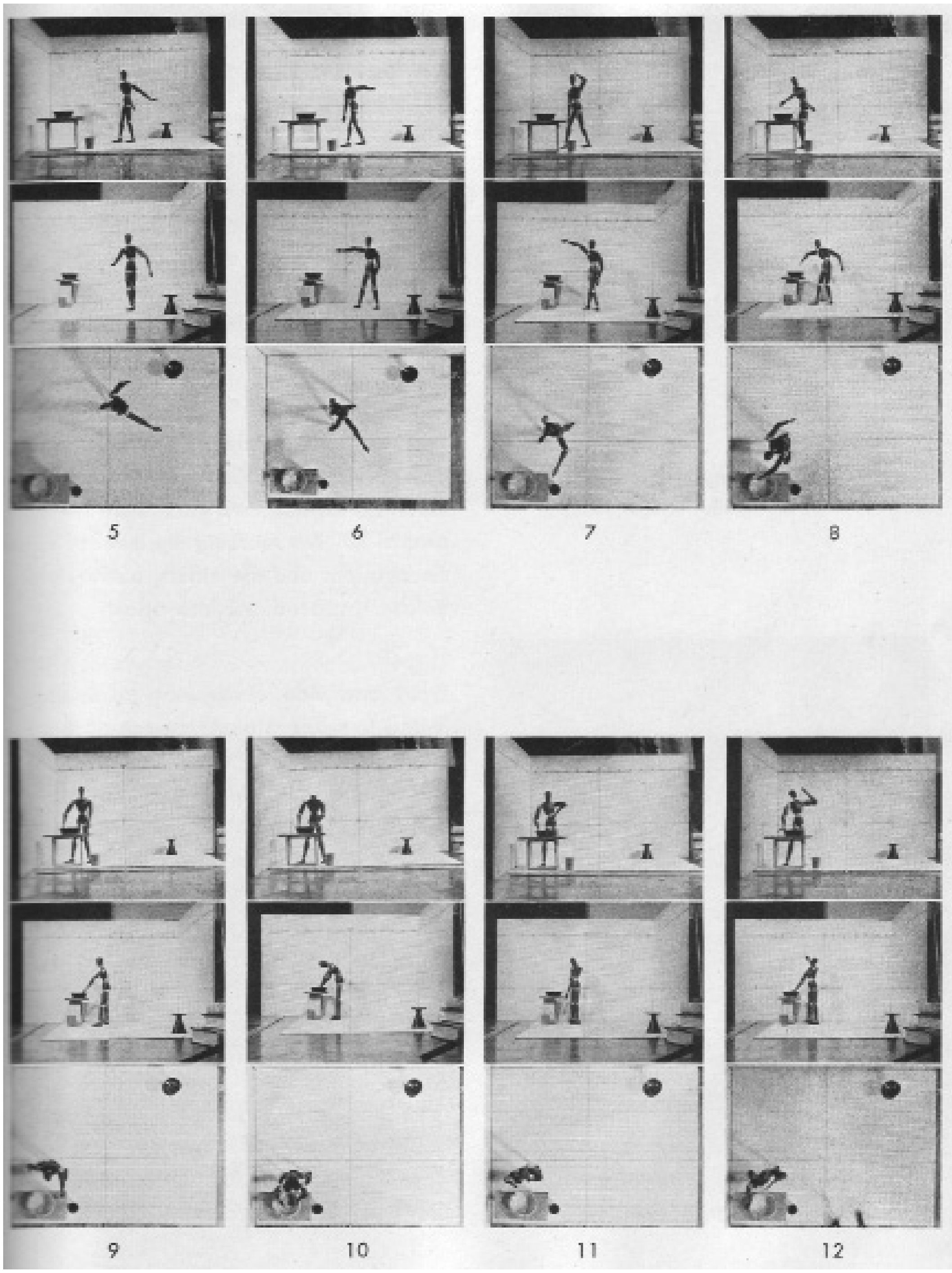
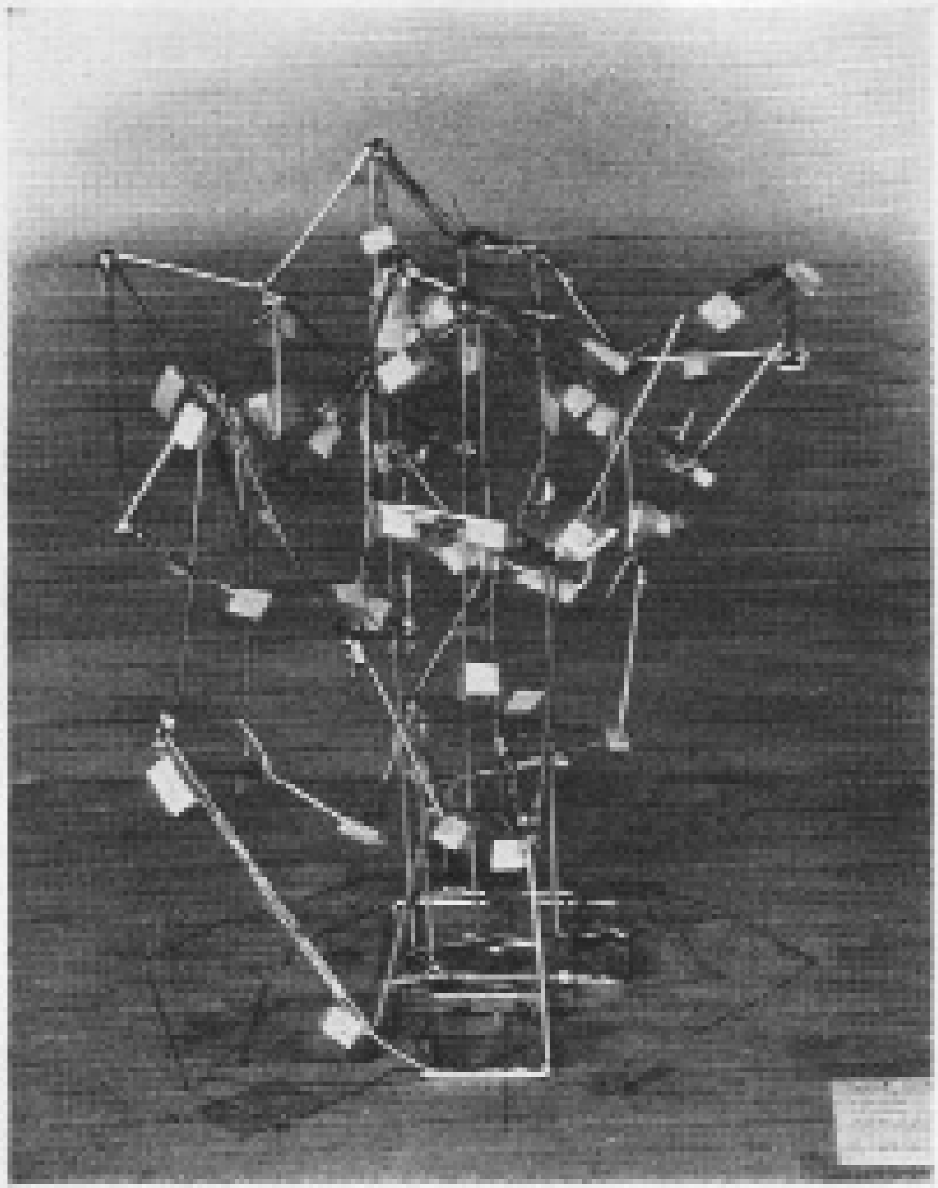


Fig. 2.12

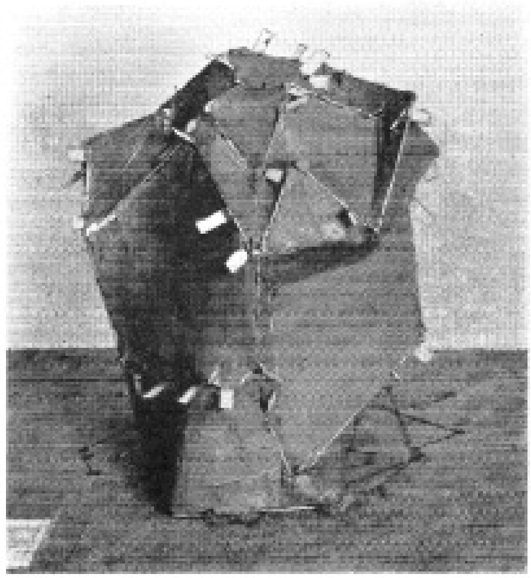
Testing the New Photographic Method in Small Scale (B). Jane Callaghan and Catherine Palmer, *Measuring Space and Motion*. New York: The John B. Pierce Foundation, 1944.



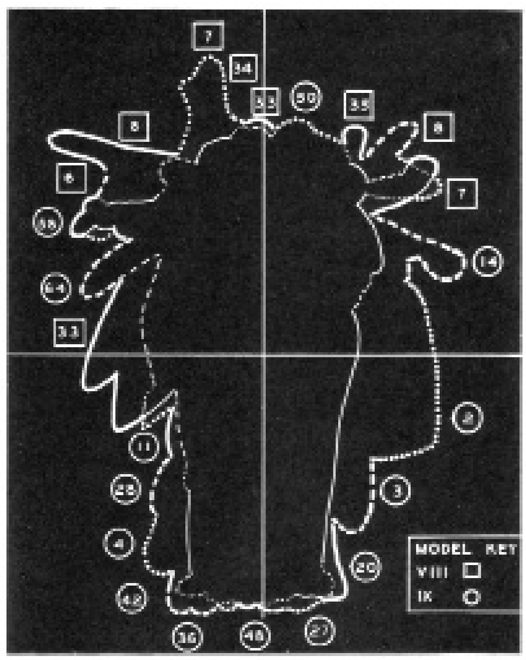
ARMATURE—MODEL 8
Critical points tagged with identifying numbers

Fig. 2.13

Armature—Model 8. Jane Callaghan and Catherine Palmer, *Measuring Space and Motion*. New York: The John B. Pierce Foundation, 1944.



MODEL 9
MAN DRESSING



COMPOSITE FRONT TRACINGS
Combined to select points for armature of Model 10

Fig. 2.14

Model 9—Man Dressing (above) and Composite Front Tracings. Jane Callaghan and Catherine Palmer, *Measuring Space and Motion*. New York: The John B. Pierce Foundation, 1944.

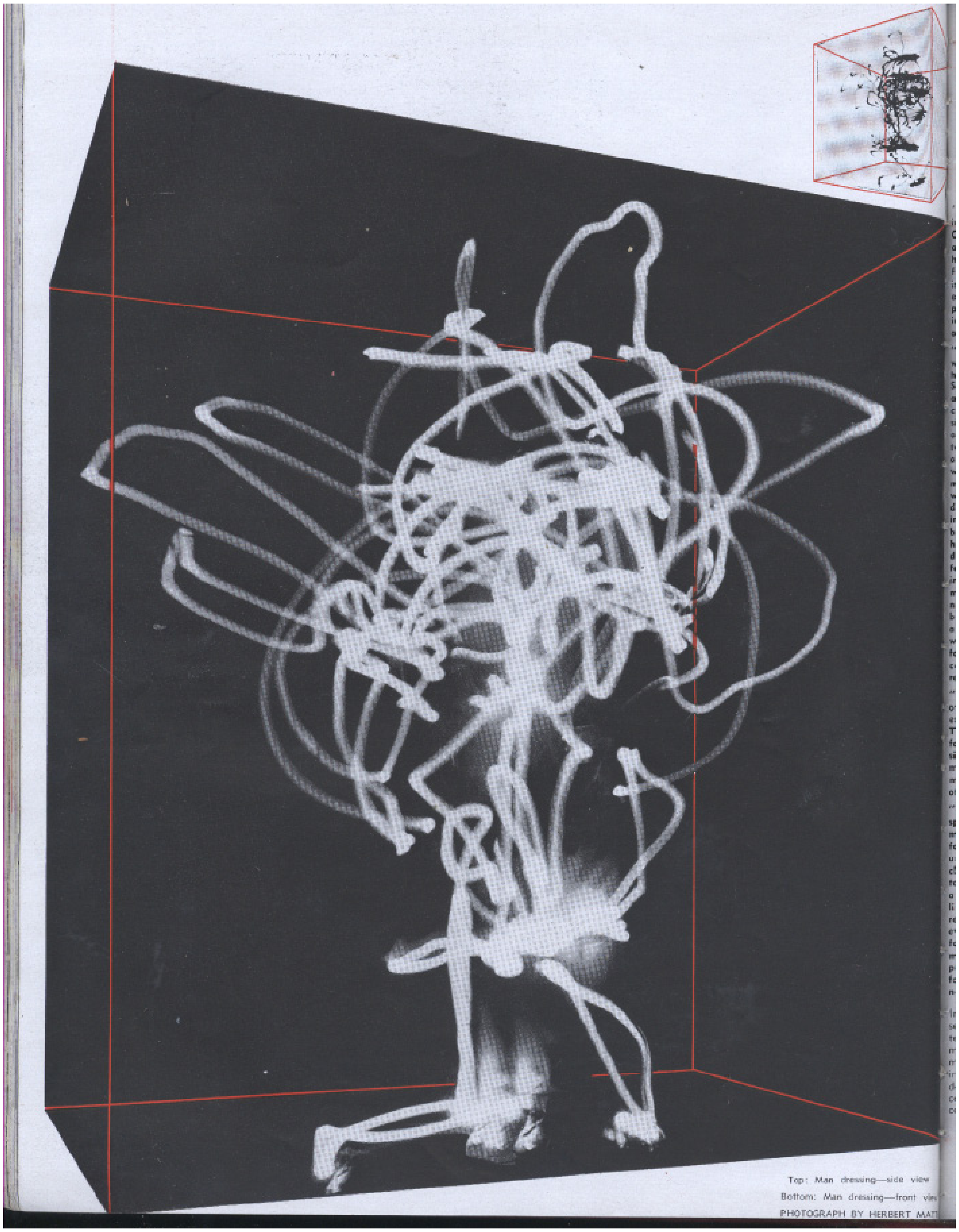


Fig. 2.15

Man Dressing by Herbert Matter. Charles Eames, John Entenza and Herbert Matter, "What Is a House?" *Arts and Architecture* (July 1944).

Fig. 2.16

Site Plan – Stansbury Estates. "Houses for Defense." *Architectural Forum* (November 1941).

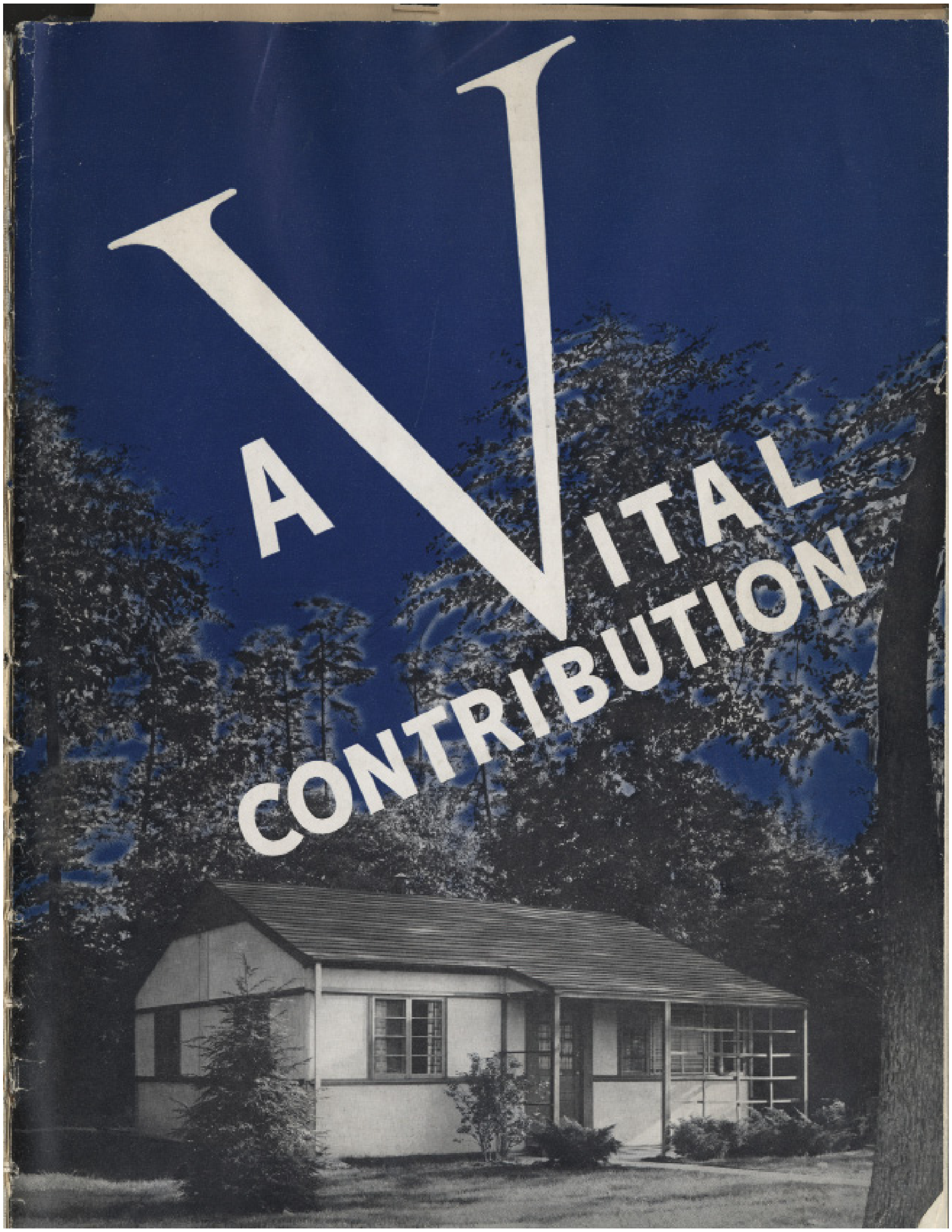


Fig. 2.17

Cover. *A Vital Contribution*. Chicago: Celotex Corp., 1941.

Structural Details of the Glenn L. Martin Company Cemesto Houses

Ground: Each house occupies a lot averaging 48′ x 100′. The dwellings are staggered around central courts. Most of them face away from the streets.

Dimensions: Each house is 24′ x 28′. Following are sizes of the rooms:

Living Room	13′ 4″ x 16′
Dining Alcove	5′ 3″ x 8′
Bedroom	10′ x 12′
Bedroom	9′ 3″ x 10′
Kitchen	5′ 3″ x 10′ 7″
Bath	5′ x 6′ 9″
Storage and Utility	5′ 3″ x 8′

Lumber and Millwork: All millwork is resin treated. Phenol plastic bonded plywood girders are similar in construction to steel girders. Gutters are wood. A bridge-like construction is employed for roof trusses. Truss ends are anchored to the girders with hurricane clips. Floors are 1¼″ thick T & G.

Walls: Exterior walls are Celotex Cemesto Board 1½″ thick. This material provides ample insulation to assure that the house will be cool in summer, warm in winter and economical to heat. Cemesto Board provides both inner and outer wall surfaces which require no paint, reducing both initial cost and upkeep. However, Cemesto Board may be painted if desired. Partitions are 1″ Cemesto Board.

Roof: The roof is built with structural Celo-Roof Insulating Roof Units which possess high insulation value. Heavy butts cause shadow lines, which heretofore have been available only in more expensive roofs. Celo-Roof consists of specially formed sheets of Celotex insulation, 7 feet long and 15 inches wide, encased in heavy asphalt roofing felt surfaced with selected mineral granules. The roof is flashed with copper and lead flashings. The attic is ventilated.

Ceilings: Ceilings are constructed of Celotex Key Joint Units, an insulating material $^{25}/_{32}$″ thick, with a pleasing ivory color.

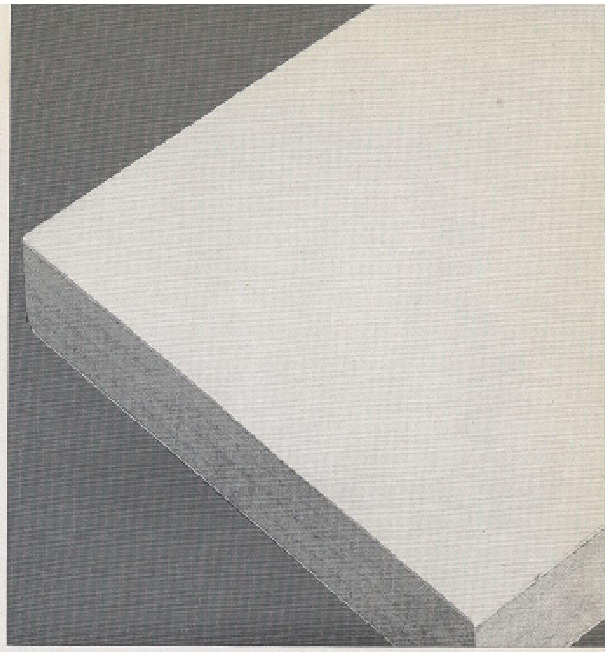
Windows and Doors: Wood casement windows are used. Doors and windows are completely weather-stripped. The two "picture windows" in the living room are equipped with Venetian blinds. Copper screens are also provided.

Heating: The house is heated with an oil burner which is submerged flush with the floor. A porcelain enamel flue and chimney conserves heat.

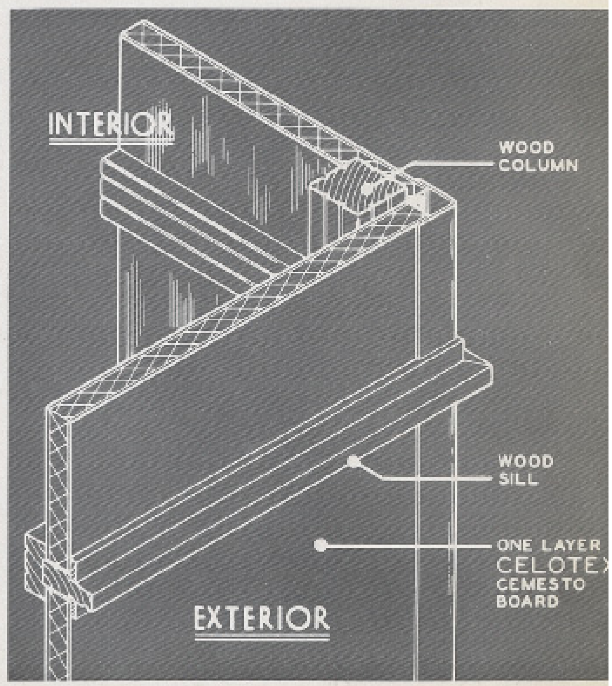
Electrical Equipment: The electric meter is on the outside. The new type switch boxes do not require fuses. The following electrical equipment is included: electric refrigerator, electric hot water heater, electric stove, electric oven.

Kitchen and Bathroom: The kitchen is provided with built-in cabinets and a linoleum floor. The combination sink and laundry tub has a swing faucet; the counter has a linoleum work surface and is trimmed with metal. The bathroom has a built-in tub with shower and is tile-trimmed, with linoleum on the walls and floor. The water lines are copper.

Porch: The porch has a poured concrete floor, and stepping stones lead to the common sidewalk.



Close-up of Celotex Cemesto Board.



Detail of Cemesto Wall Construction.

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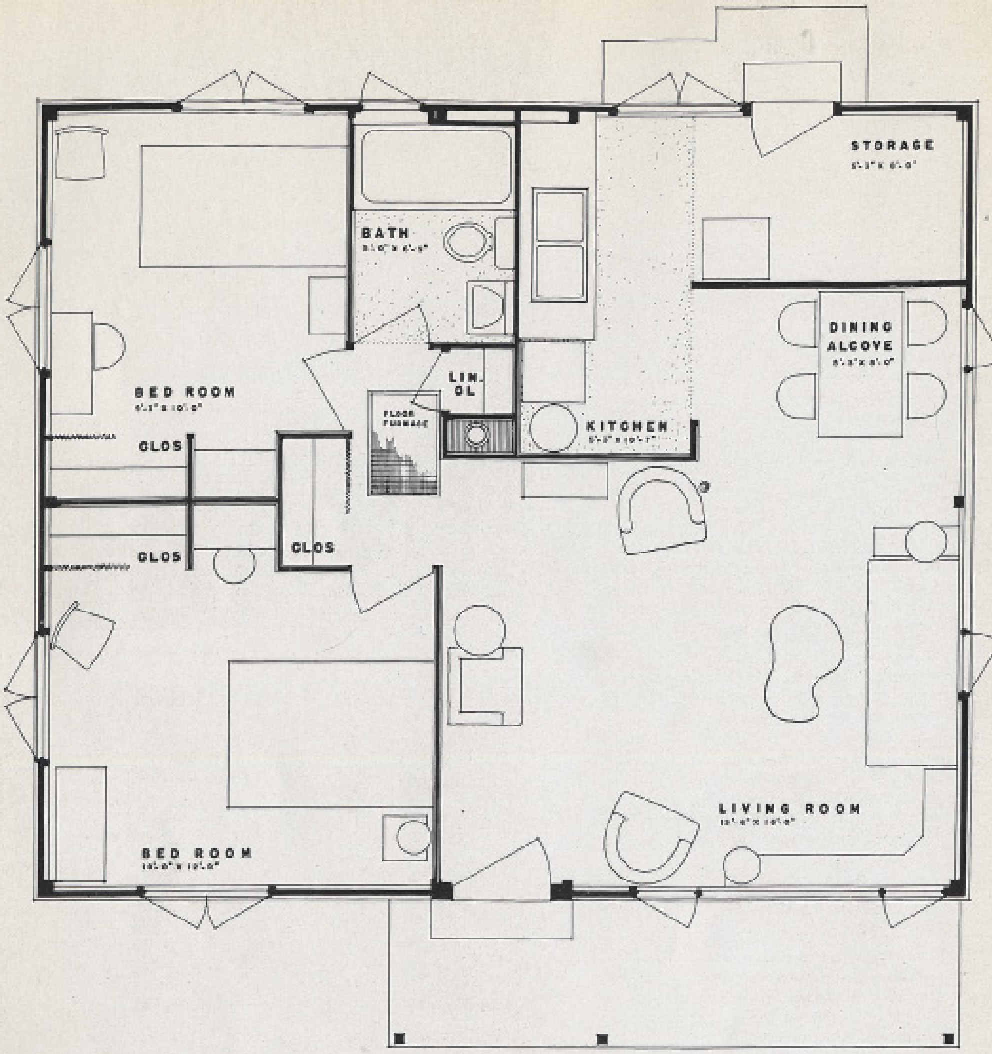
Fig. 2.18

Structural Details of the Glenn L. Martin Company Cemesto Houses. *A Vital Contribution*. Chicago: Celotex Corp., 1941.



DESIGN FOR MODERN LIVING

Wisdom gained through a decade of practical experience in planning homes for families of modest income was called into service in laying out the floor plan of the Cemesto houses in Baltimore. Living rooms are spacious in proportion to the size of the dwellings, so that families have ample room for everyday living and for entertaining their guests. Including the dining alcove, the living room is more than 21 feet long. The bedrooms are small, but window and wall areas have been planned to permit pleasing and practical placing of furniture. Each bedroom has a closet, and in the hall, clothes and linen closets are provided. The kitchens, too, are small, following the modern trend, with adjoining utility space for storage or for keeping washing machines and other necessary household appliances.

Fig. 2.19

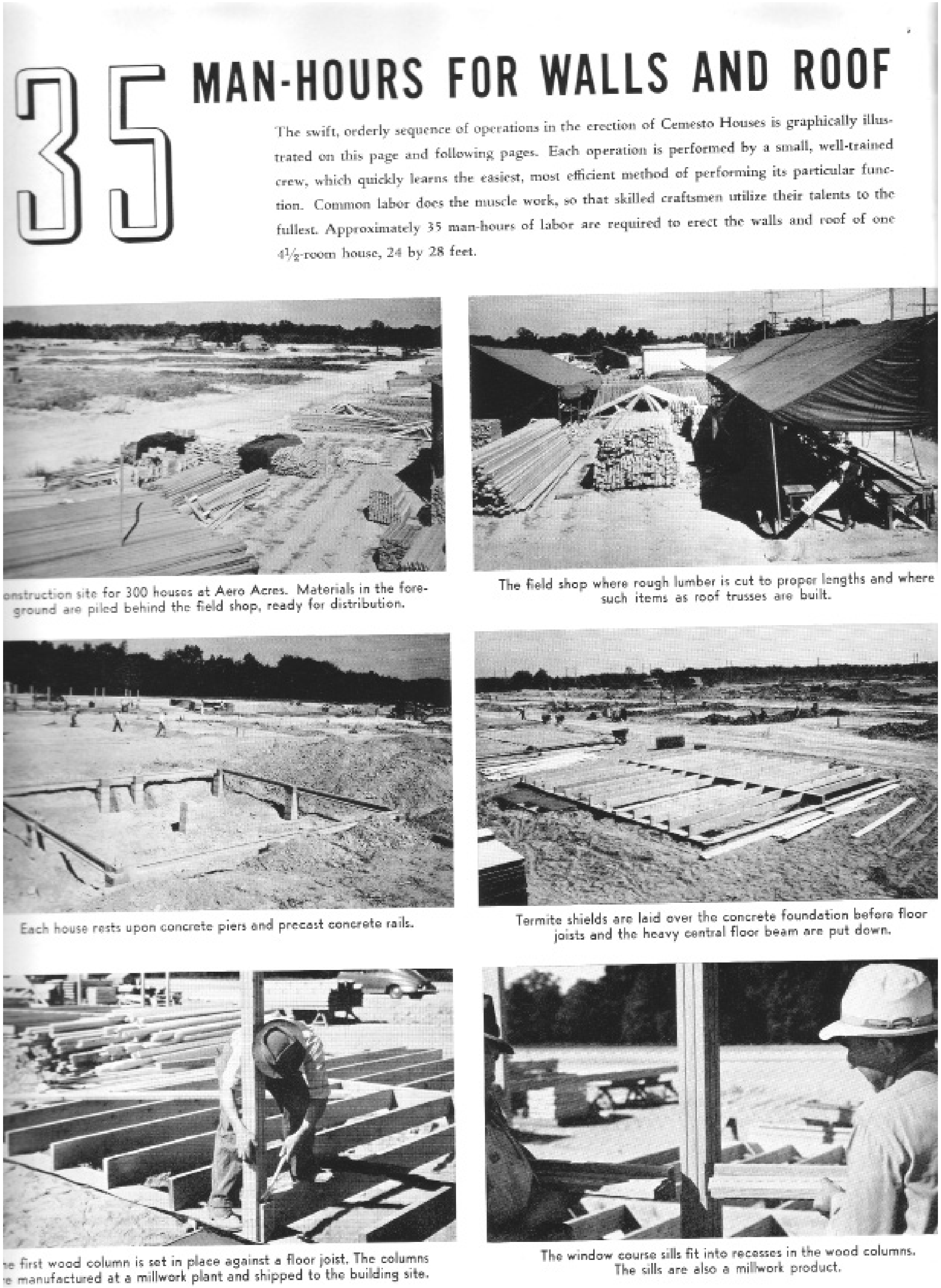
Plan. *A Vital Contribution*. Chicago: Celotex Corp., 1941.

Fig. 2.20

Cemesto Houses. *A Vital Contribution*. Chicago: Celotex Corp., 1941.

Fig. 2.21

Interior. *A Vital Contribution*. Chicago: Celotex Corp., 1941.



35 MAN-HOURS FOR WALLS AND ROOF

The swift, orderly sequence of operations in the erection of Cemesto Houses is graphically illustrated on this page and following pages. Each operation is performed by a small, well-trained crew, which quickly learns the easiest, most efficient method of performing its particular function. Common labor does the muscle work, so that skilled craftsmen utilize their talents to the fullest. Approximately 35 man-hours of labor are required to erect the walls and roof of one 4½-room house, 24 by 28 feet.

onstruction site for 300 houses at Aero Acres. Materials in the foreground are piled behind the field shop, ready for distribution.

The field shop where rough lumber is cut to proper lengths and where such items as roof trusses are built.

Each house rests upon concrete piers and precast concrete rails.

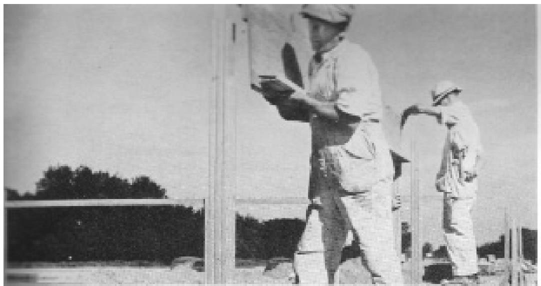
Termite shields are laid over the concrete foundation before floor joists and the heavy central floor beam are put down.

ne first wood column is set in place against a floor joist. The columns e manufactured at a millwork plant and shipped to the building site.

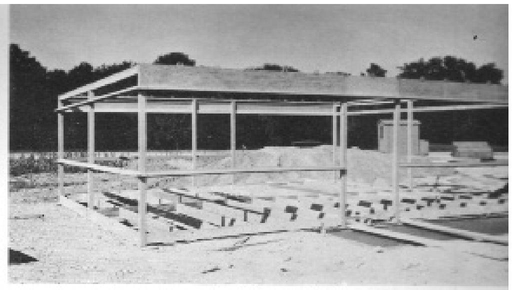
The window course sills fit into recesses in the wood columns. The sills are also a millwork product.

Fig. 2.22

Construction of Cemesto Houses (A). *A Vital Contribution*. Chicago: Celotex Corp., 1941.

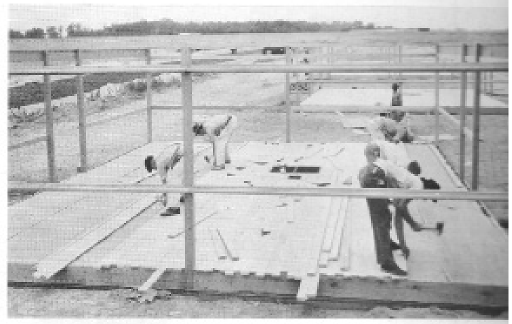


Tops of the columns are bound together with wood girders.



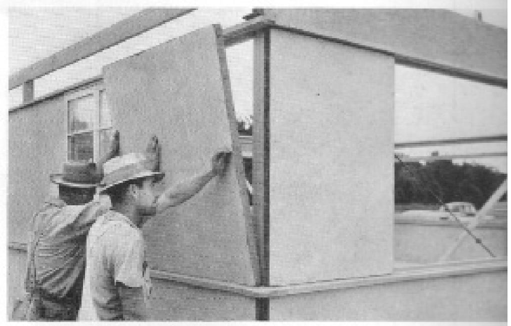
Here floor and wall framing has been completed.

An oil burning floor furnace is put into each house before the flooring is laid.

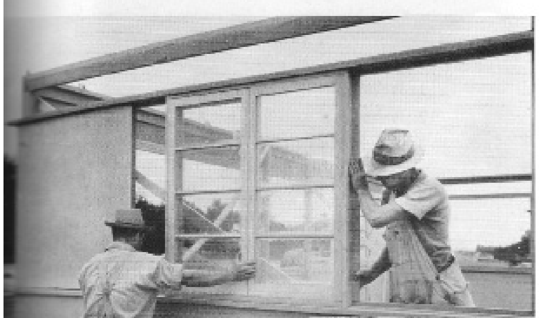


The floors are laid with 1¼" thick T and G flooring.

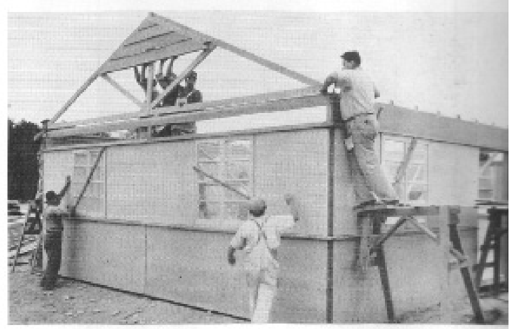
A sheet of 1½" Celotex Cemesto Board is being applied to the lower section of a wall. This Cemesto panel is 12 feet long and 4 feet wide.



A short Cemesto Board panel is put into place at a corner of window course. The Cemesto is nailed to the wood columns.



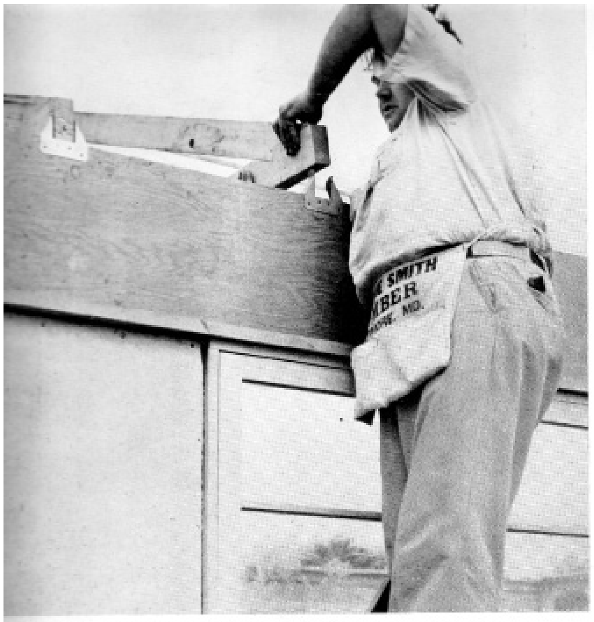
A wood casement window, complete with frame, is slipped into place.



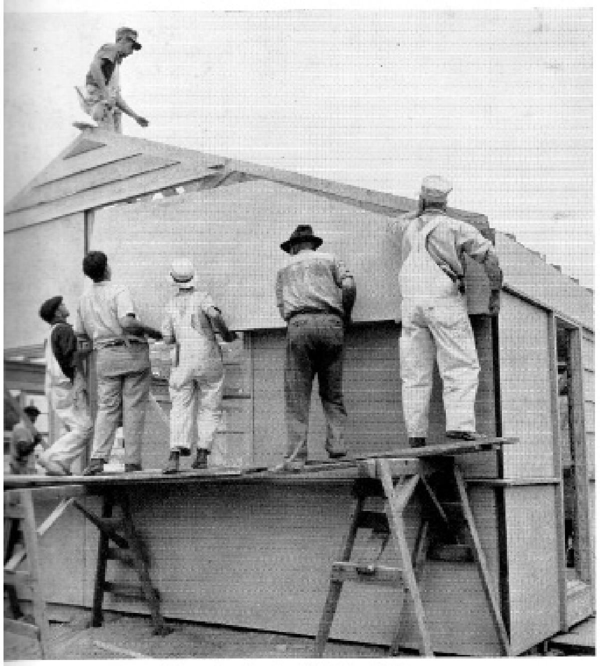
An end roof truss, equipped with ventilating louvres, is fitted into position.

Fig. 2.23

Construction of Cemesto Houses (B). *A Vital Contribution*. Chicago: Celotex Corp., 1941.



The end of a roof truss is being dropped into a hurricane clip. The clips are attached to the wall girders before the girders are delivered to the house site.



A Cemesto Board gable is installed.

CONTINUED FROM PAGE 7

building trades craftsmen are setting new standards for residential construction on this project.

How Low Cost is Achieved

Low cost is achieved by the new method of construction which conserves materials, increases labor efficiency, and which utilizes a single thickness wall material in place of the eight or ten separately applied layers, such as sheathing, building paper, insulation, lath, multiple coats of plaster, wallpaper, and paint employed in traditional wall construction.

The efficiency of the construction method is demonstrated by the fact that the entire exterior structure of the Baltimore house—walls, doors, windows, and roof—is being erected on a schedule of approximately thirty-five man-hours, or less than one day with a crew of five men. This is a modern combination of methods, labor and materials which alone makes such a project possible.

The Material

Cemesto Board, which comprises the complete wall of the house, including exterior and inside finish and ample insulation against heat and cold, is a product which has been developed for just this purpose over a ten-year period of intensive research, improvement, and practical experimentation by The Celotex Corporation. The product consists of a cane fibre insulation board core, sealed with a special bitustatic compound between two layers of a weather-, fire- and wear-resistant combination of asbestos and cement. The finished material is light in weight, easy to handle and work, and meets all the basic requirements for a unit thickness wall material.

It is interesting to note that Cemesto Board closely conforms with the definition of the ideal wall material, presented by Temporary National Economic Committee in its Monograph No. 8. This monograph is accepted by building authorities as the most complete work on the subject of low cost house development. The following quotation is from the monograph:

> "The ideal material for greatest efficiency in the building of houses should possess the following qualities:
>
> 1. It should be light in weight.
> 2. It should be structurally strong.
> 3. It should be durable.
> 4. It should be fire resistant.
> 5. It should be moisture, weather, and sound proof, and should have a low rate of expansion.

CONTINUED ON PAGE 12

Fig. 2.24

Construction of Cemesto Houses (C). *A Vital Contribution*. Chicago: Celotex Corp., 1941.

Fig. 2.25

Major General Leslie R. Groves holding a chunk of uranium ore. From Robert De Vore, “The Man Who Made Manhattan.” *Collier’s*, October 13, 1945.

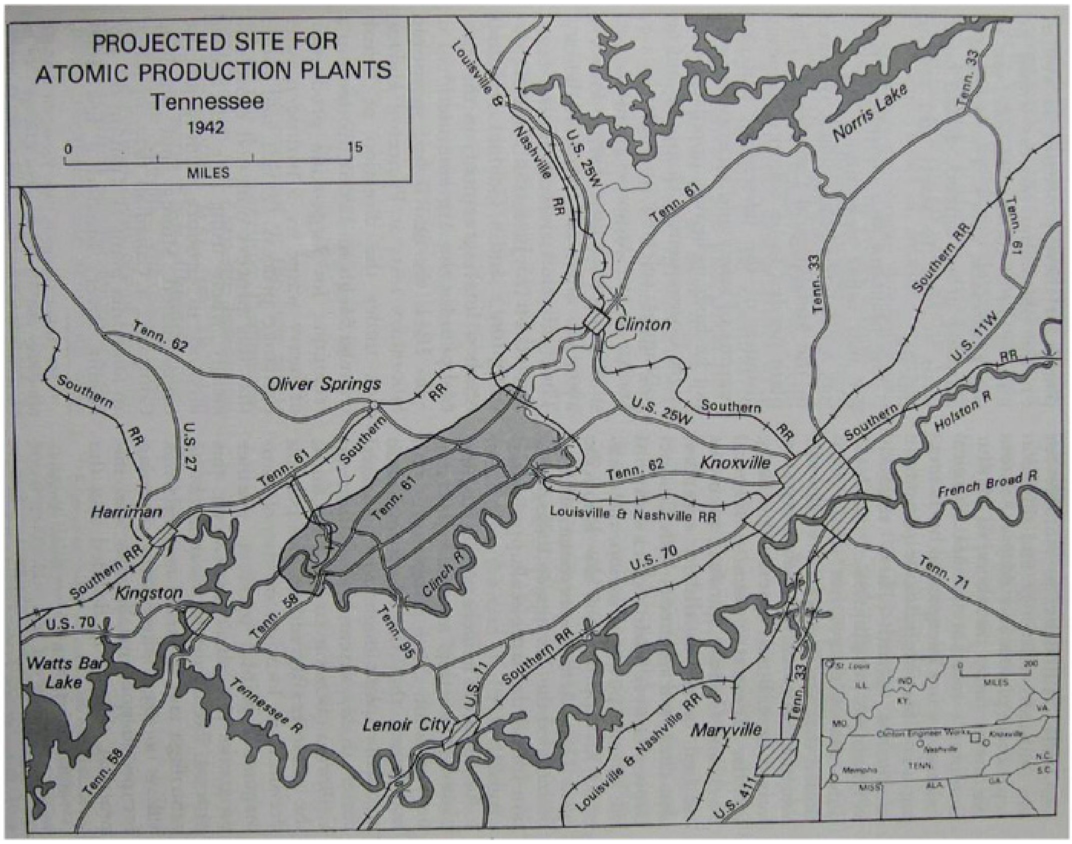


Fig. 2.26

Map of Projected Site for Atomic Production Plants (1942).

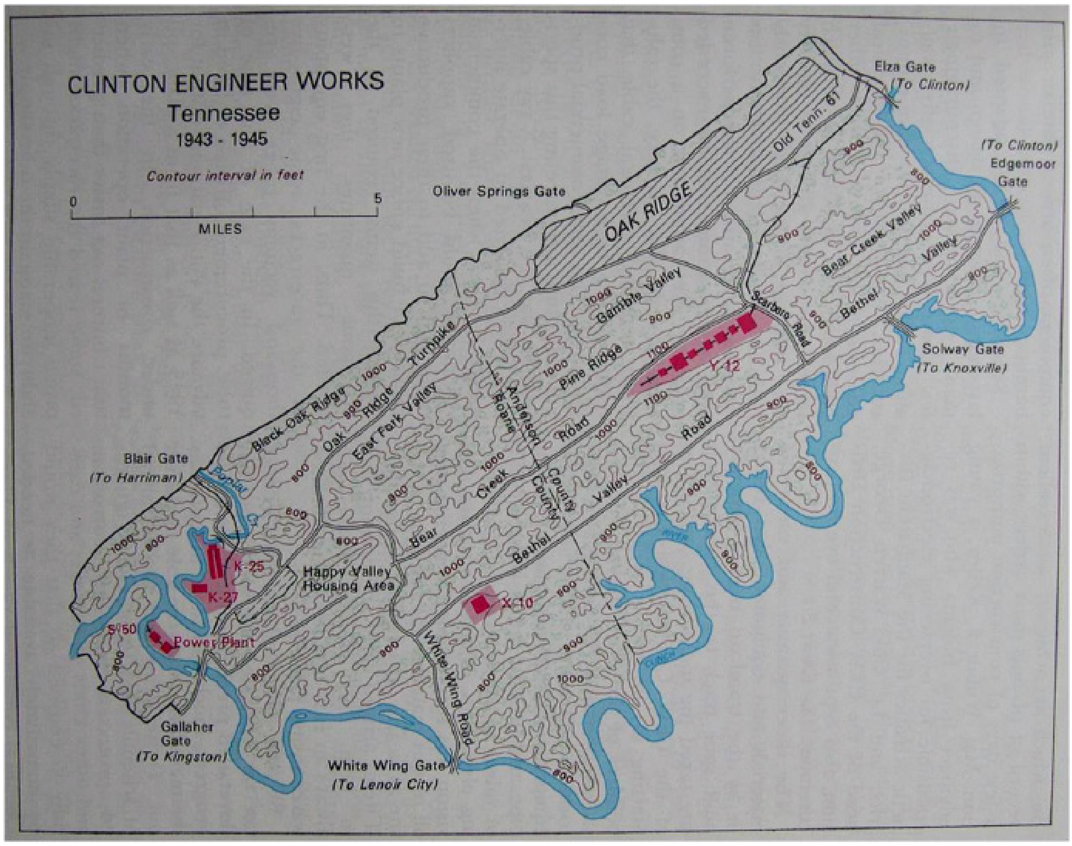
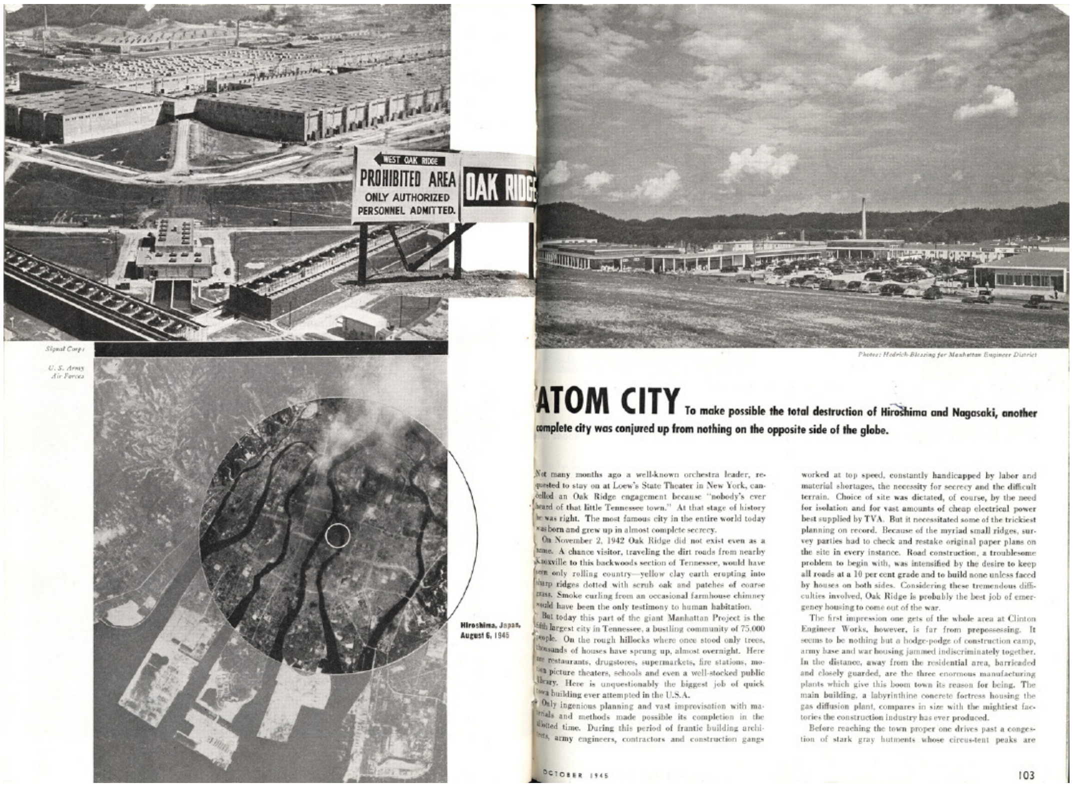


Fig. 2.27

Locations of nuclear facilities at Clinton Engineer Works (1943-45).

Fig. 2.28

An air view of one of the giant production plants at the Clinton Engineer Works. From Skidmore, Owings & Merrill, *Report to the Atomic Energy Commission on the Master Plan, Oak Ridge, Tennessee*. New York: Skidmore, Owings & Merrill, 1948.



Signal Corps

U. S. Army Air Forces

Hiroshima, Japan, August 6, 1945

Photos: Hedrich-Blessing for Manhattan Engineer District

ATOM CITY

To make possible the total destruction of Hiroshima and Nagasaki, another complete city was conjured up from nothing on the opposite side of the globe.

Not many months ago a well-known orchestra leader, requested to stay on at Loew's State Theater in New York, cancelled an Oak Ridge engagement because "nobody's ever heard of that little Tennessee town." At that stage of history he was right. The most famous city in the entire world today was born and grew up in almost complete secrecy.

On November 2, 1942 Oak Ridge did not exist even as a name. A chance visitor, traveling the dirt roads from nearby Knoxville to this backwoods section of Tennessee, would have seen only rolling country—yellow clay earth erupting into sharp ridges dotted with scrub oak and patches of coarse grass. Smoke curling from an occasional farmhouse chimney would have been the only testimony to human habitation.

But today this part of the giant Manhattan Project is the fifth largest city in Tennessee, a bustling community of 75,000 people. On the rough hillocks where once stood only trees, thousands of houses have sprung up, almost overnight. Here are restaurants, drugstores, supermarkets, fire stations, motion picture theaters, schools and even a well-stocked public library. Here is unquestionably the biggest job of quick town building ever attempted in the U.S.A.

Only ingenious planning and vast improvisation with materials and methods made possible its completion in the allotted time. During this period of frantic building architects, army engineers, contractors and construction gangs worked at top speed, constantly handicapped by labor and material shortages, the necessity for secrecy and the difficult terrain. Choice of site was dictated, of course, by the need for isolation and for vast amounts of cheap electrical power best supplied by TVA. But it necessitated some of the trickiest planning on record. Because of the myriad small ridges, survey parties had to check and restake original paper plans on the site in every instance. Road construction, a troublesome problem to begin with, was intensified by the desire to keep all roads at a 10 per cent grade and to build none unless faced by houses on both sides. Considering these tremendous difficulties involved, Oak Ridge is probably the best job of emergency housing to come out of the war.

The first impression one gets of the whole area at Clinton Engineer Works, however, is far from prepossessing. It seems to be nothing but a hodge-podge of construction camp, army base and war housing jammed indiscriminately together. In the distance, away from the residential area, barricaded and closely guarded, are the three enormous manufacturing plants which give this boom town its reason for being. The main building, a labyrinthine concrete fortress housing the gas diffusion plant, compares in size with the mightiest factories the construction industry has ever produced.

Before reaching the town proper one drives past a congestion of stark gray hutments whose circus-tent peaks are

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Fig. 2.29

"Atom City." *Architectural Forum* (October 1945). Images of a nuclear facility, Hiroshima on August 6, 1945 and Jackson Square at Oak Ridge. "To make possible total destruction of Hiroshima and Nagasaki, another complete city was conjured up from nothing on the opposite side of the globe."

Fig. 2.30

Housing and Street Construction. Photo in 1943. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.31

Street Construction. Photo in 1946. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.32

Work Crew Laying Drainage Pipes. Photo in 1943. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.33

Cemesto Housing Construction. Photo in 1943. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.34

Cemesto Housing Construction. Photo in 1943. Department of Energy Collection. Oak Ridge Public Library.

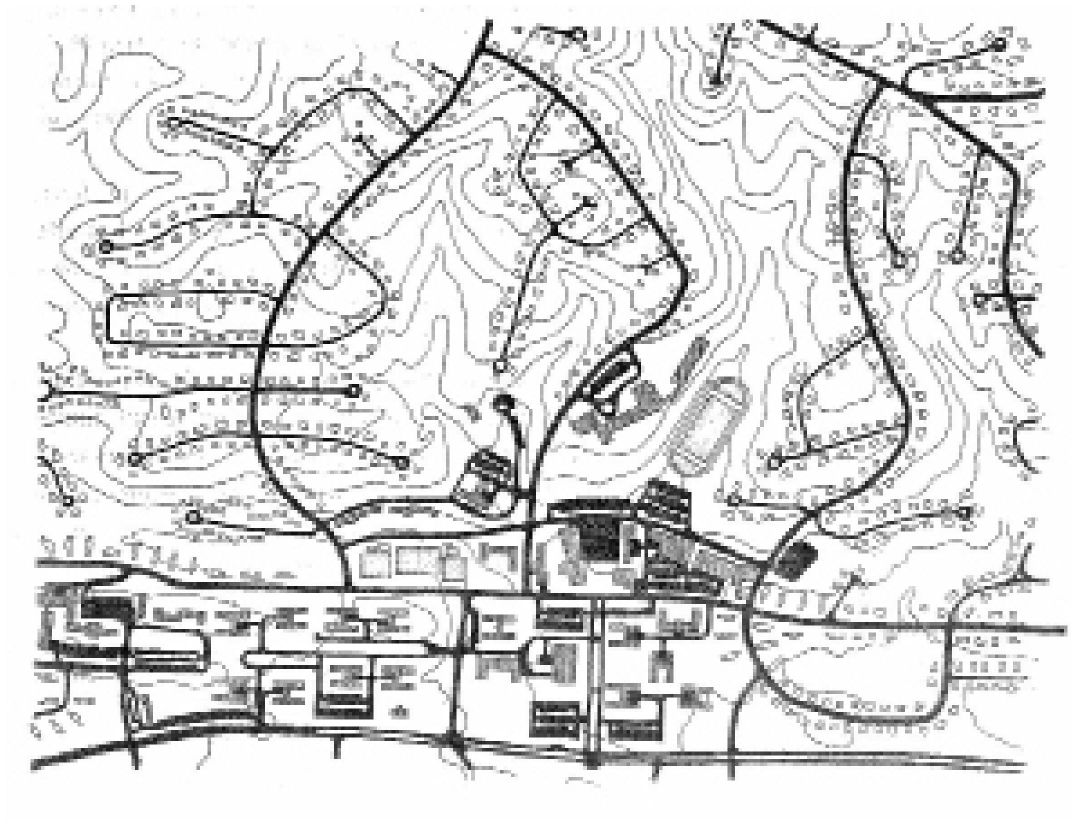


Fig. 2.35

Town Center. From *Architectural Forum* (October 1945).

Fig. 2.36

C House. Photo in 1944. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.37

B House. Photo in 1943. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.38

D House. Photo in 1944. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.39

F House. Photo in 1944. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.40

Aerial View of Cemesto Houses. B, C, & D Types. Photo in 1945. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.41

Dormitory Complex. Photo in 1944. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.42

Children Playing at Community Center 1. Photo in 1944. Department of Energy Collection. Oak Ridge Public Library.

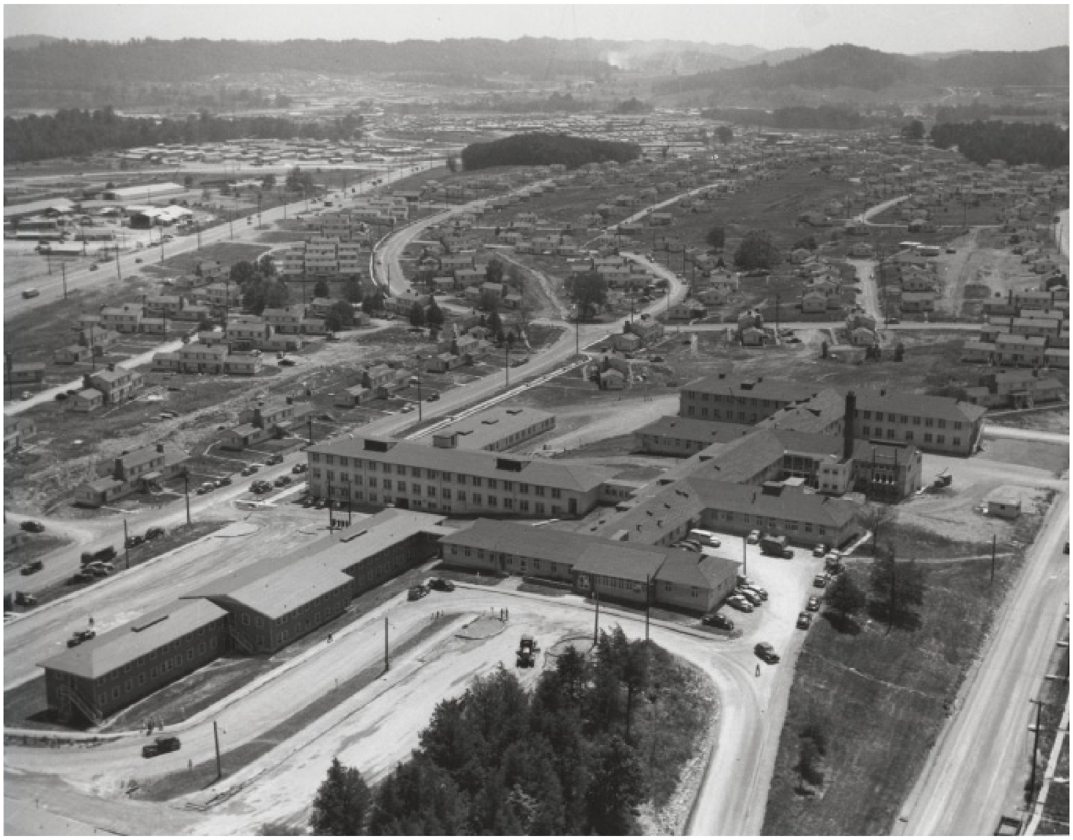


Fig. 2.43

Aerial View of Hospital. Photo in 1945. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.44

Aerial View of Jackson Square Area and High School and Field. Photo in 1945. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.45

Guest House. Photo in 1945. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.46

Hutment Area. Photo in 1945. Department of Energy Collection. Oak Ridge Public Library.

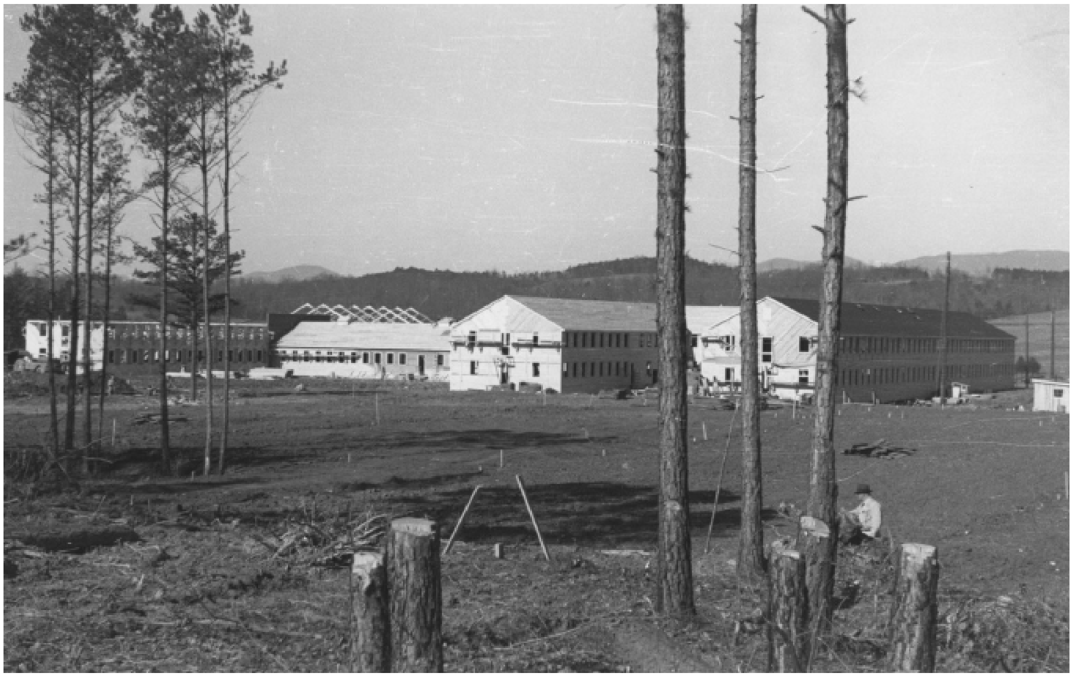


Fig. 2.47

Construction of the Administration Building. Photo in 1943. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.48

Aerial view of West Oak Ridge, looking Northeast. Photo in 1945. Department of Energy Collection. Oak Ridge Public Library.

Fig. 2.49

Sloan Valve Company advertisement, showing buildings by Skidmore, Owings & Merrill. *Progressive Architecture* (June 1951).

Fig. 3.1

Connecticut General Life Insurance Company. Bloomfield, Connecticut. Built 1954-57. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

Fig. 3.2

Inland Steel Company Building. Chicago. Built 1956-58. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

Fig. 3.3

Union Carbide Corporation Building. New York City. Built 1957-60. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

Fig. 3.4

Chase Manhattan Bank Building. New York City. Built 1957-61. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

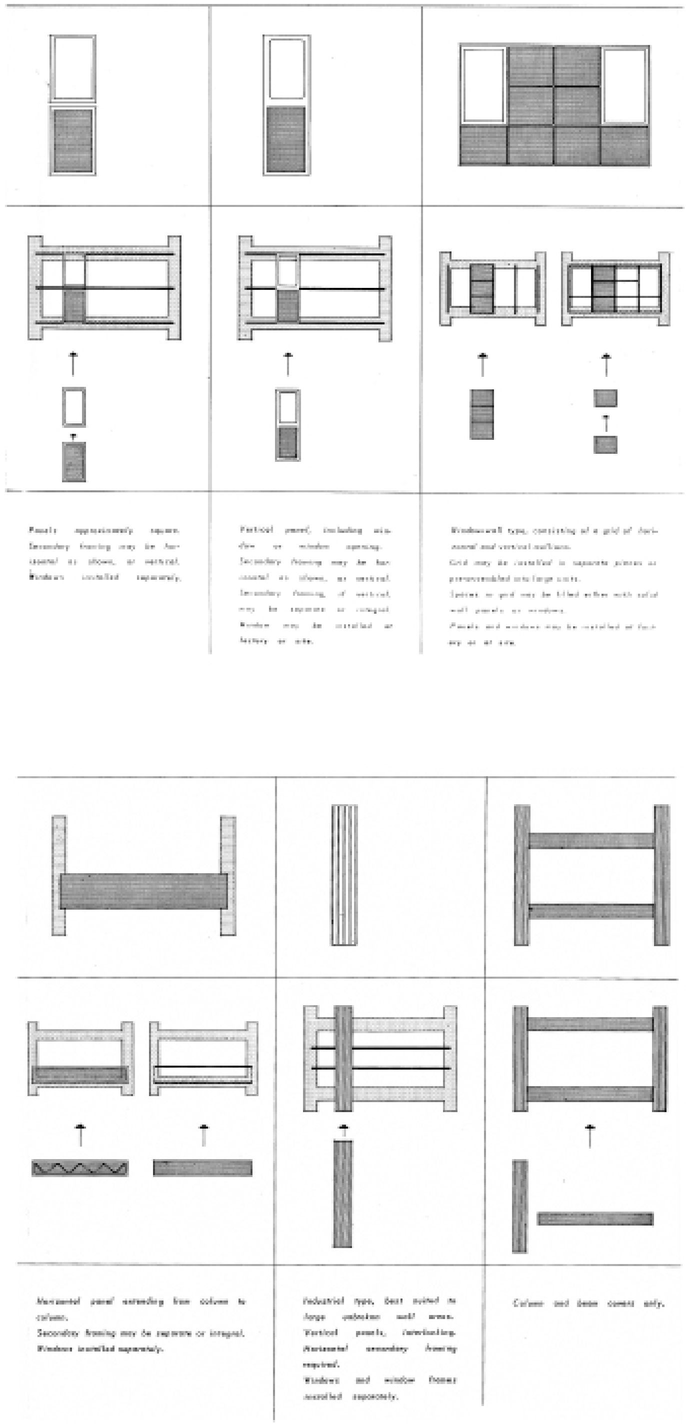


Fig. 3.5

Basic Curtain Wall Units. Princeton University School of Architecture and American Iron and Steel Institute. Committee of Stainless Steel Producers. *Curtain Walls of Stainless Steel, a Study Prepared for the Committee of Stainless Steel Producers, American Iron and Steel Institute*. Princeton, N.J., 1955.

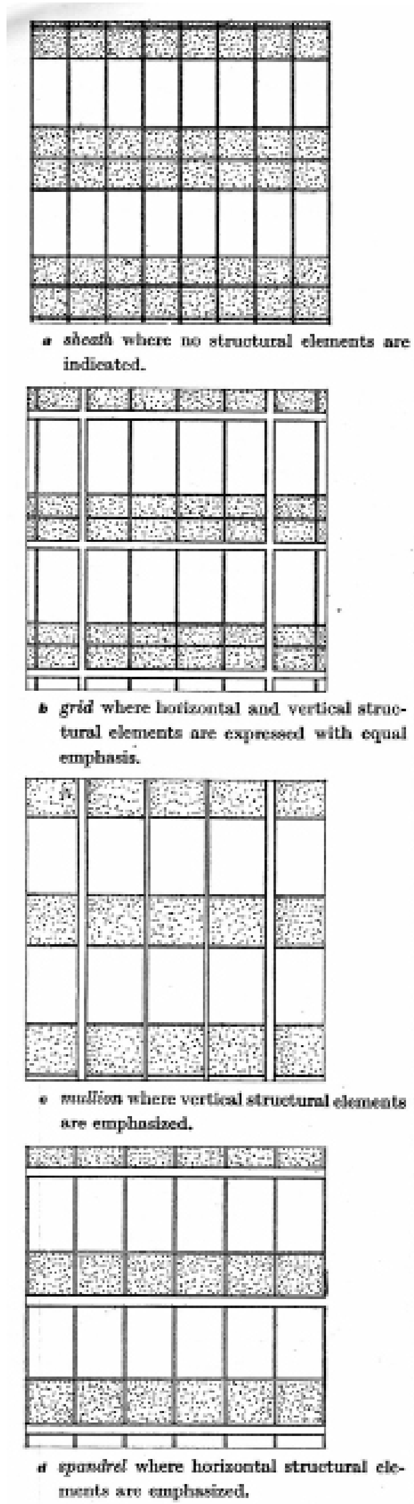
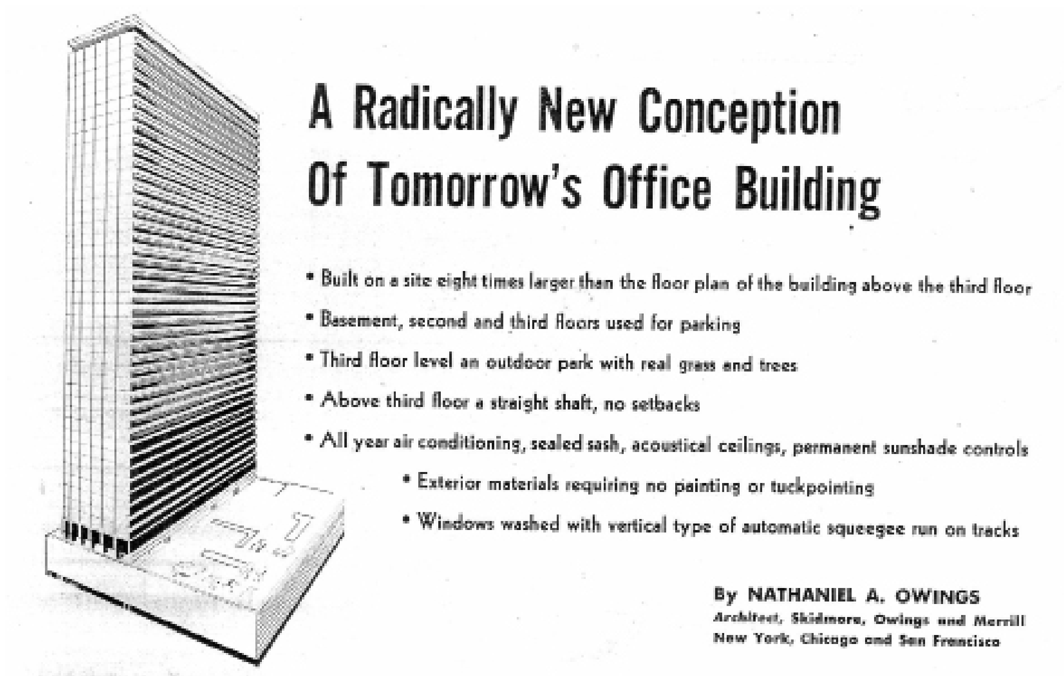


Fig. 3.6

Curtain Wall Classifications. *Machine Made America, Architectural Review* (May 1957).



A Radically New Conception
Of Tomorrow's Office Building

- Built on a site eight times larger than the floor plan of the building above the third floor
- Basement, second and third floors used for parking
- Third floor level an outdoor park with real grass and trees
- Above third floor a straight shaft, no setbacks
- All year air conditioning, sealed sash, acoustical ceilings, permanent sunshade controls
- Exterior materials requiring no painting or tuckpointing
- Windows washed with vertical type of automatic squeegee run on tracks

By NATHANIEL A. OWINGS
Architect, Skidmore, Owings and Merrill
New York, Chicago and San Francisco

Fig. 3.7

Sketch. Nathaniel A. Owings, "A Radically New Conception of Tomorrow's Office Building." *National Real Estate and Building Journal* (January 1948).

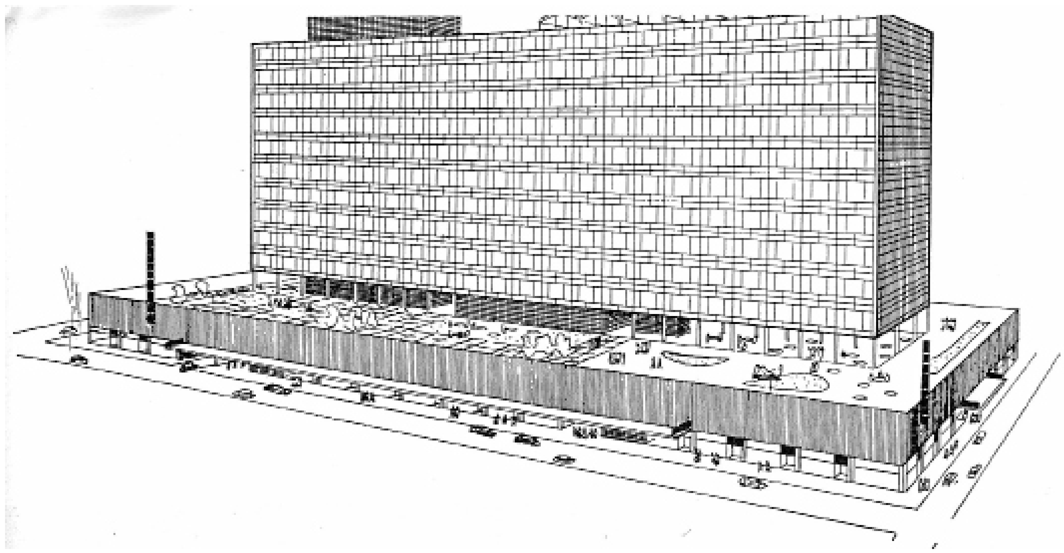


Fig. 3.8

Sketch. “Greyhound’s New Chicago Terminal.” *Architectural Record* (April 1954).

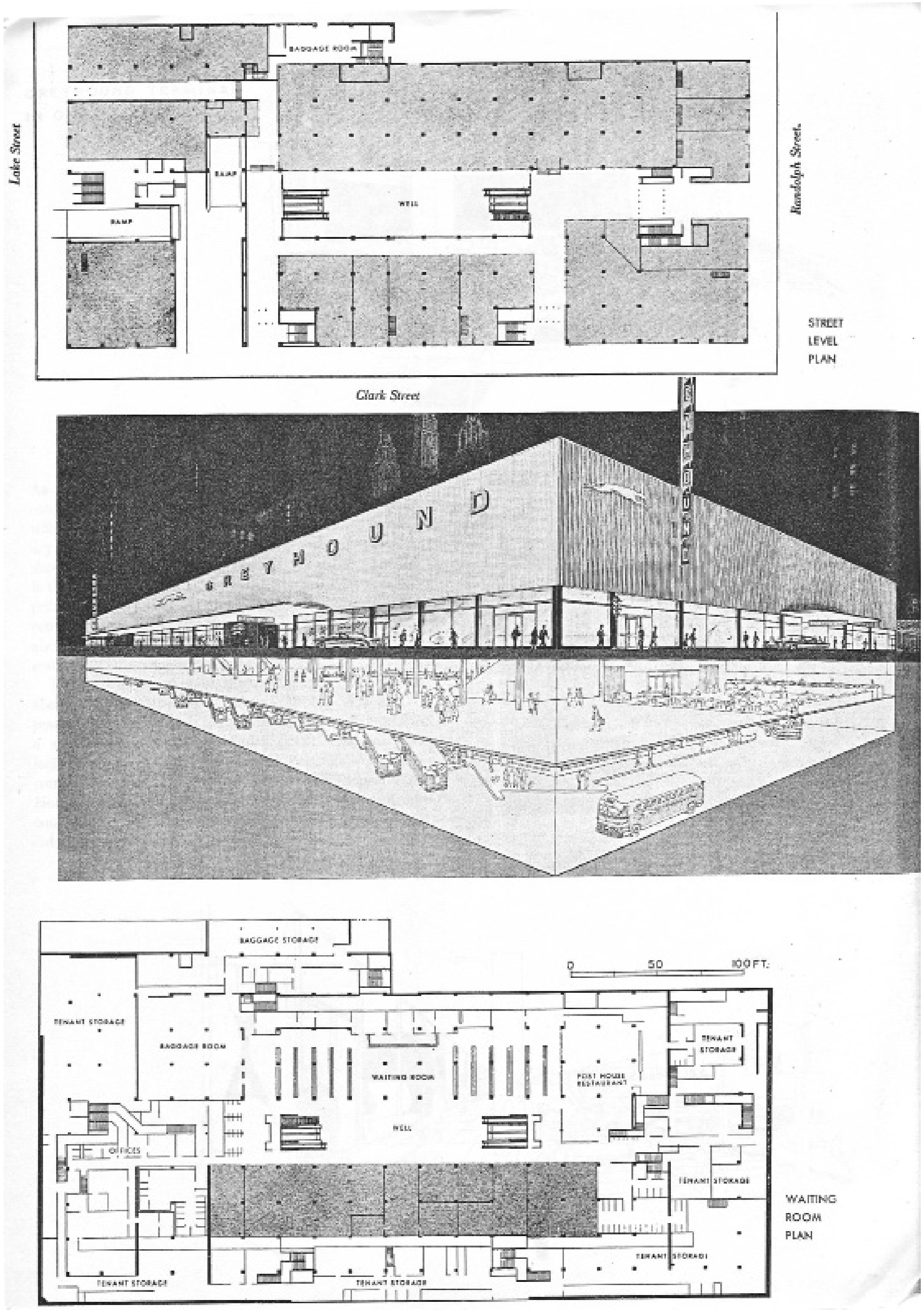


Fig. 3.9

Plans and Street Level Perspective. "Greyhound's New Chicago Terminal." *Architectural Record* (April 1954).

Fig. 3.10

Lever Brothers House. New York City. Built 1951-52. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

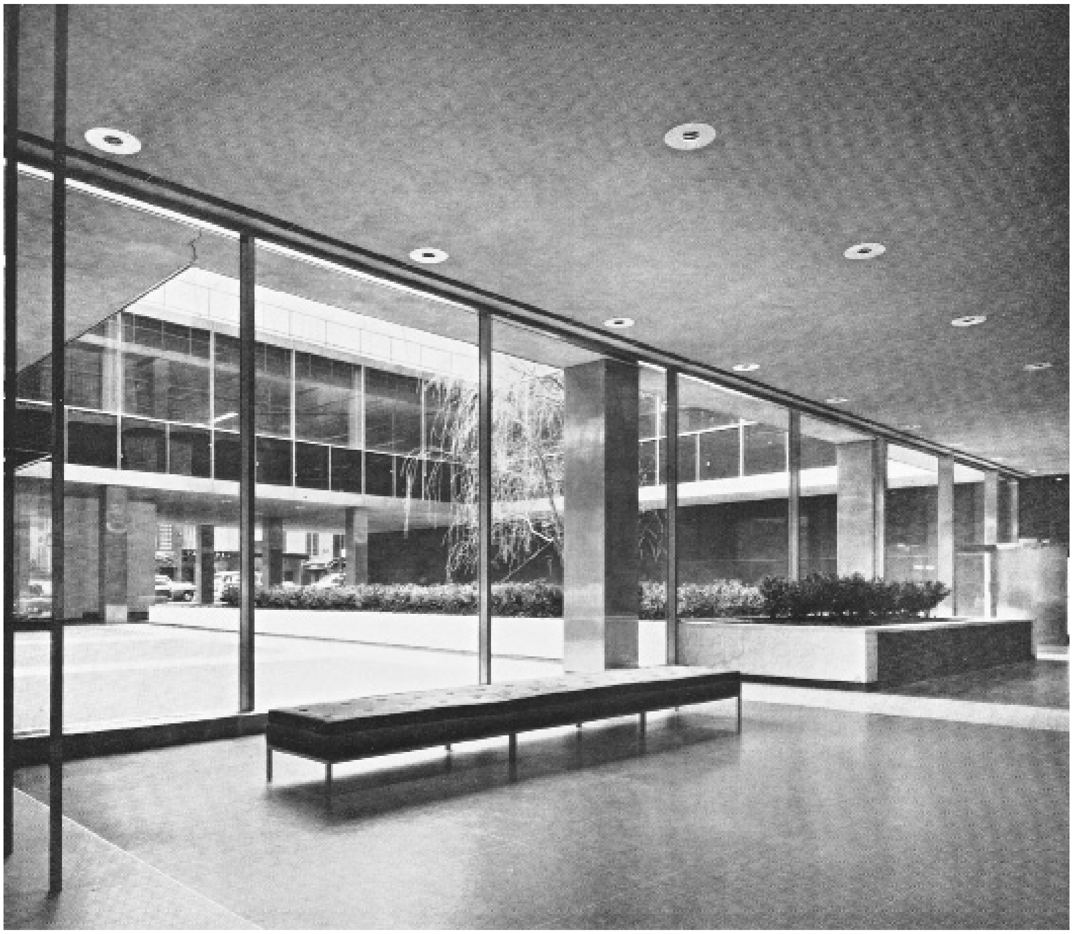


Fig. 3.11

Lower level of Lever Brothers Building. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

Fig. 3.12

Office of the Lever Brothers Building. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

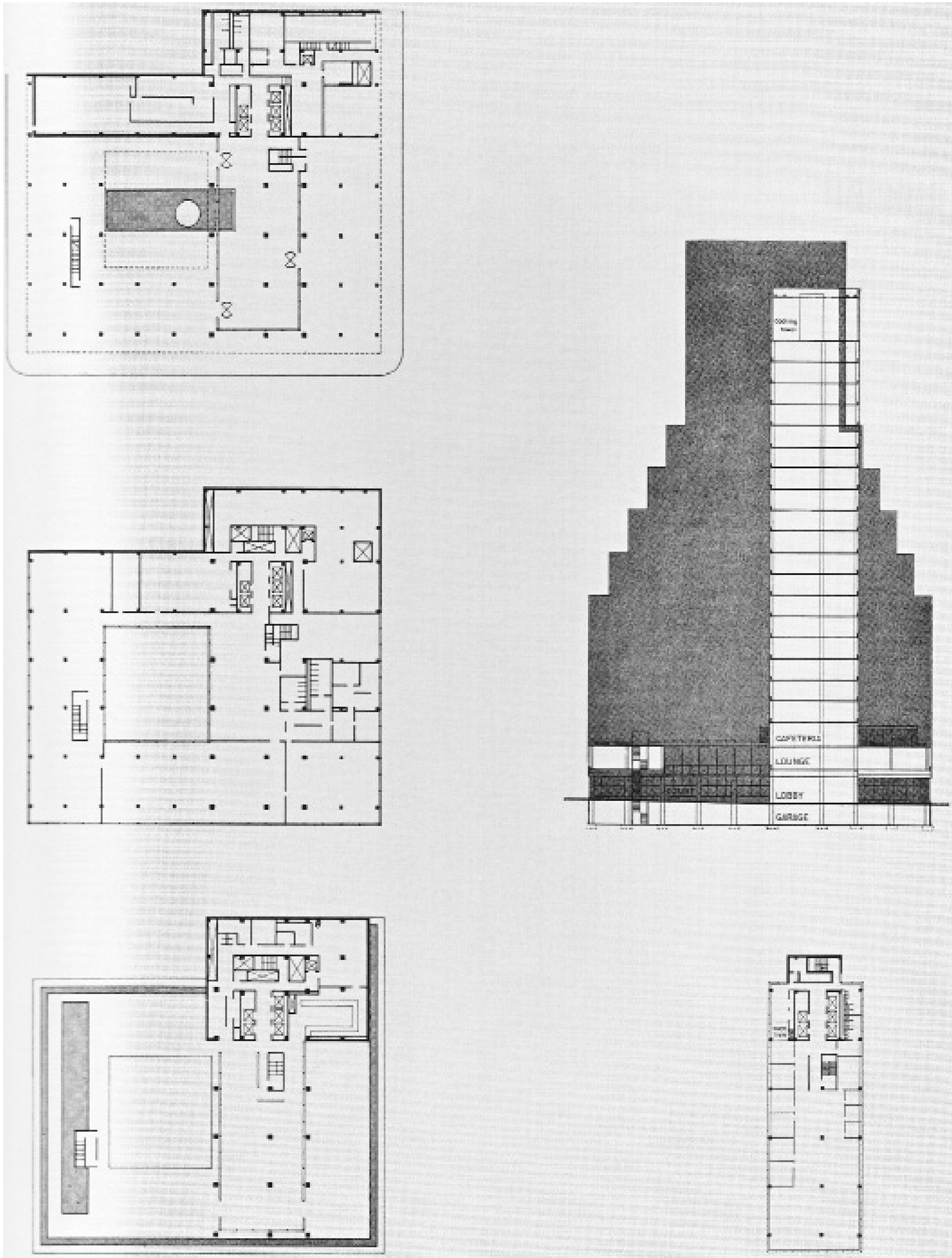


Fig. 3.13

Plans and Section of the Lever Brothers Building. From Nicholas Adams, *Skidmore, Owings & Merrill: SOM Since 1936*. Milan: Electa Architecture, 2007.

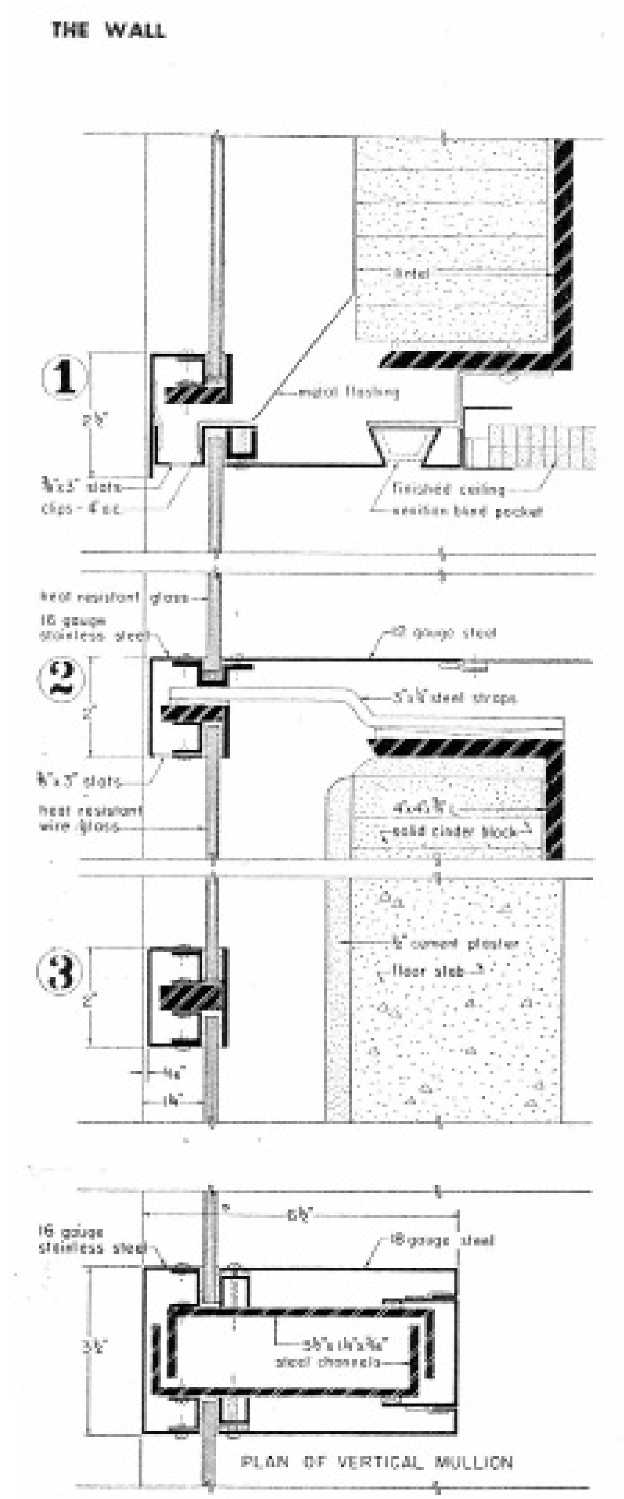


Fig. 3.14

Wall Section. “Lever House Complete.” *Architectural Forum* (June 1952).

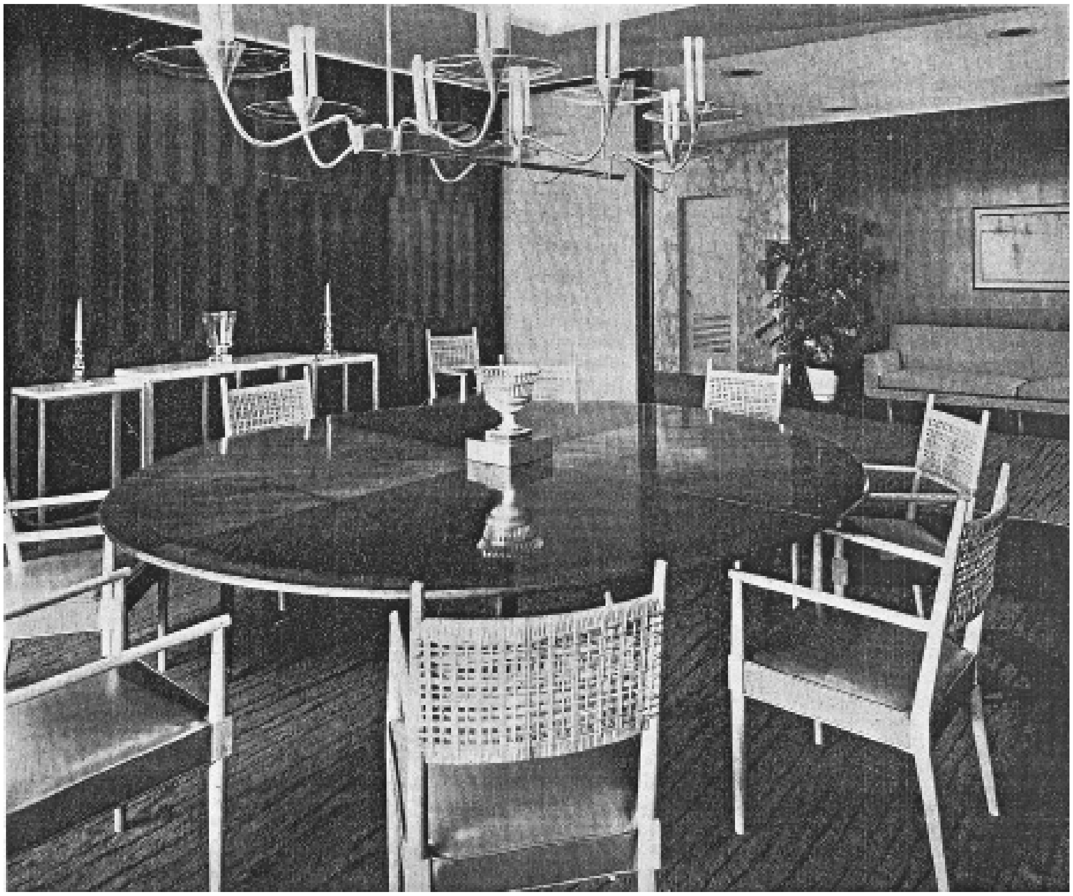


Fig. 3.15

Executive dining room by Raymond Loewy Associates. “New York’s Blue Glass Tower: An Insider’s View.” *Contract Interiors* (August 1952).

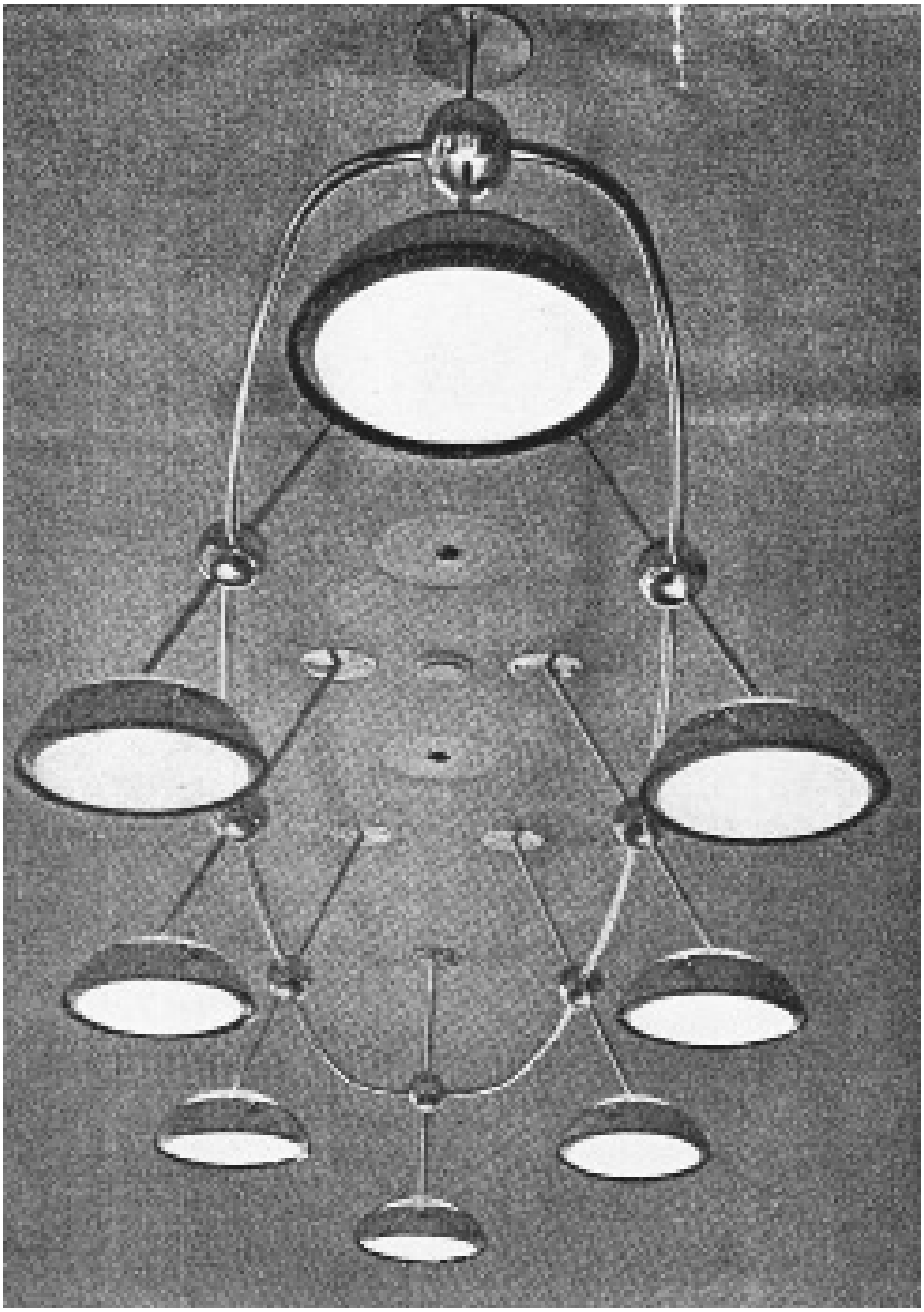


Fig. 3.16

Lighting fixture by Raymond Loewy Associates. “New York’s Blue Glass Tower: An Insider’s View.” *Contract Interiors* (August 1952).

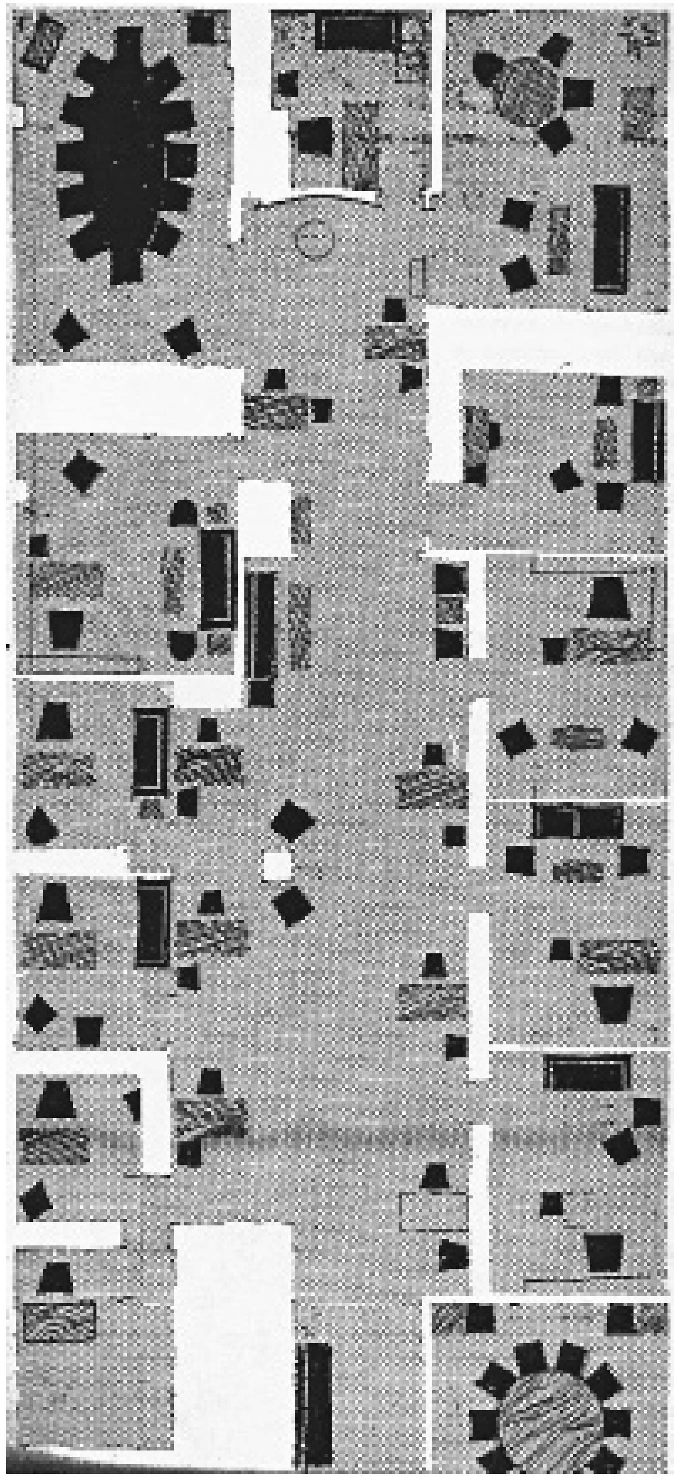


Fig. 3.17

Plan of the executive floor. “New York’s Blue Glass Tower: An Insider’s View.” *Contract Interiors* (August 1952).

Fig. 3.18

Cafeteria. From Nicholas Adams, *Skidmore, Owings & Merrill: SOM Since 1936*. Milan: Electa Architecture, 2007.

Fig. 3.19

Exterior. Manufacturers Trust Company Bank. New York City. Built 1951-54. Photo by Ezra Stoller.

Fig. 3.20

First floor. Manufacturers Trust Company Bank. New York City. Built 1951-54. Photo by Ezra Stoller.

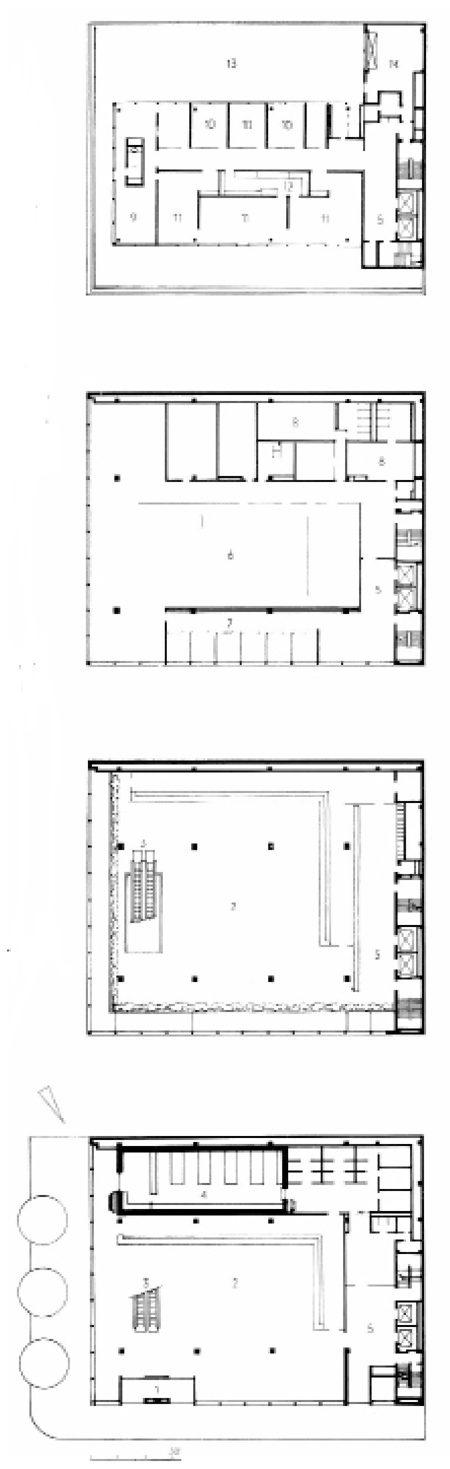


Fig. 3.21

Plans. Manufacturers Trust Company Bank. New York City. Built 1951-54. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill*, 1950-1962. London: The Architectural Press, 1963.

Fig. 3.22

Entrance. Manufacturers Trust Company Bank. New York City. Built 1951-54. Photo by Ezra Stoller.

Fig. 3.23

Second floor with a sculpture by Harry Bertoia. Manufacturers Trust Company Bank. New York City. Built 1951-54. Photo by Ezra Stoller.

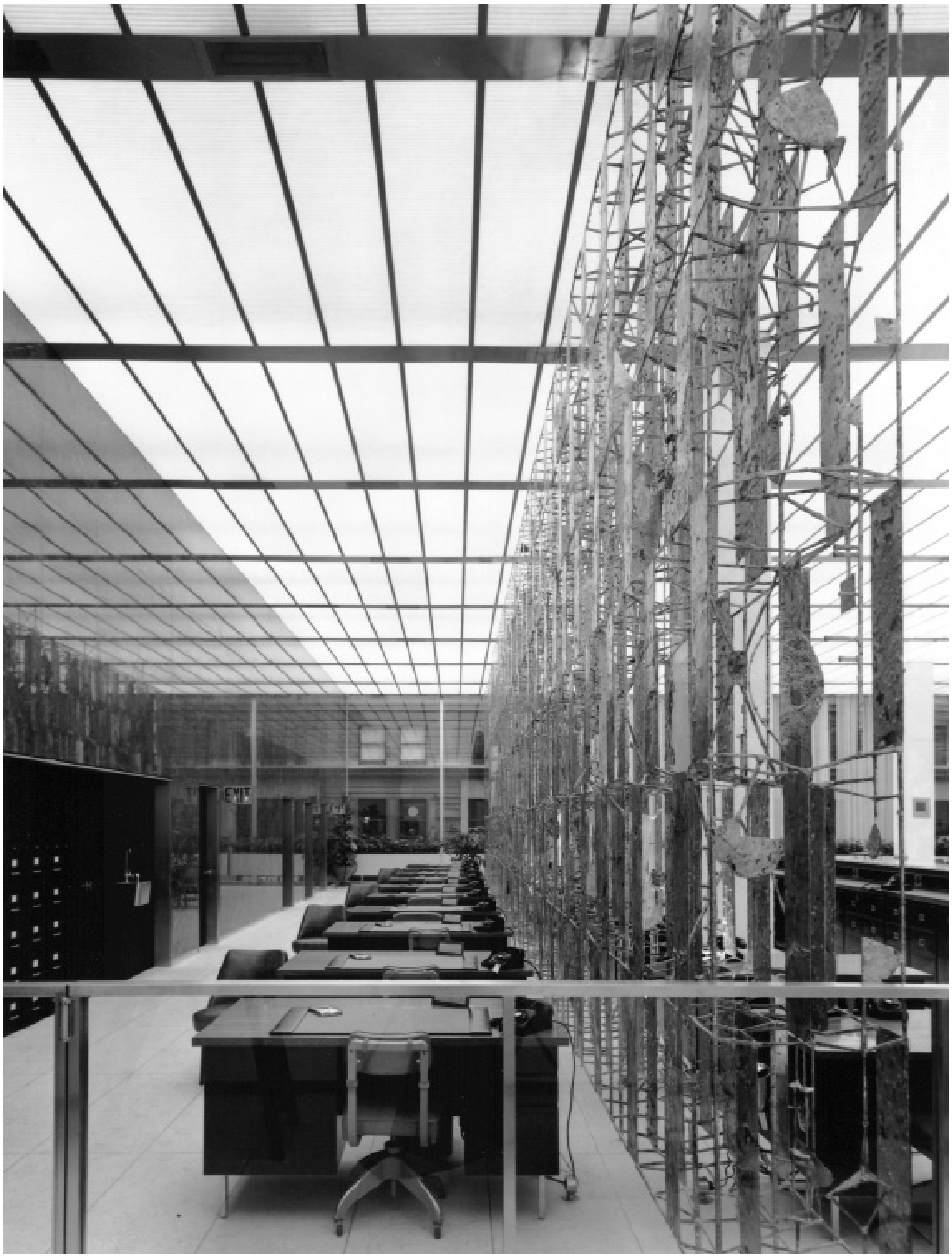


Fig. 3.24

Sculpture by Harry Bertoia. Manufacturers Trust Company Bank. New York City. Built 1951-54. Photo by Ezra Stoller.

Fig. 3.25

Cover of *A New Concept in Bank Design*. New York: Manufacturers Trust Company, 1954.

Fig. 3.26

Vault door designed by Henry Dreyfuss in collaboration with the architects and the manufacturer's engineers. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

Fig. 3.27

Symbols. Henry Dreyfuss, *Symbol Sourcebook: An Authoritative Guide to International Graphic Symbols*. New York: McGraw-Hill, 1972.

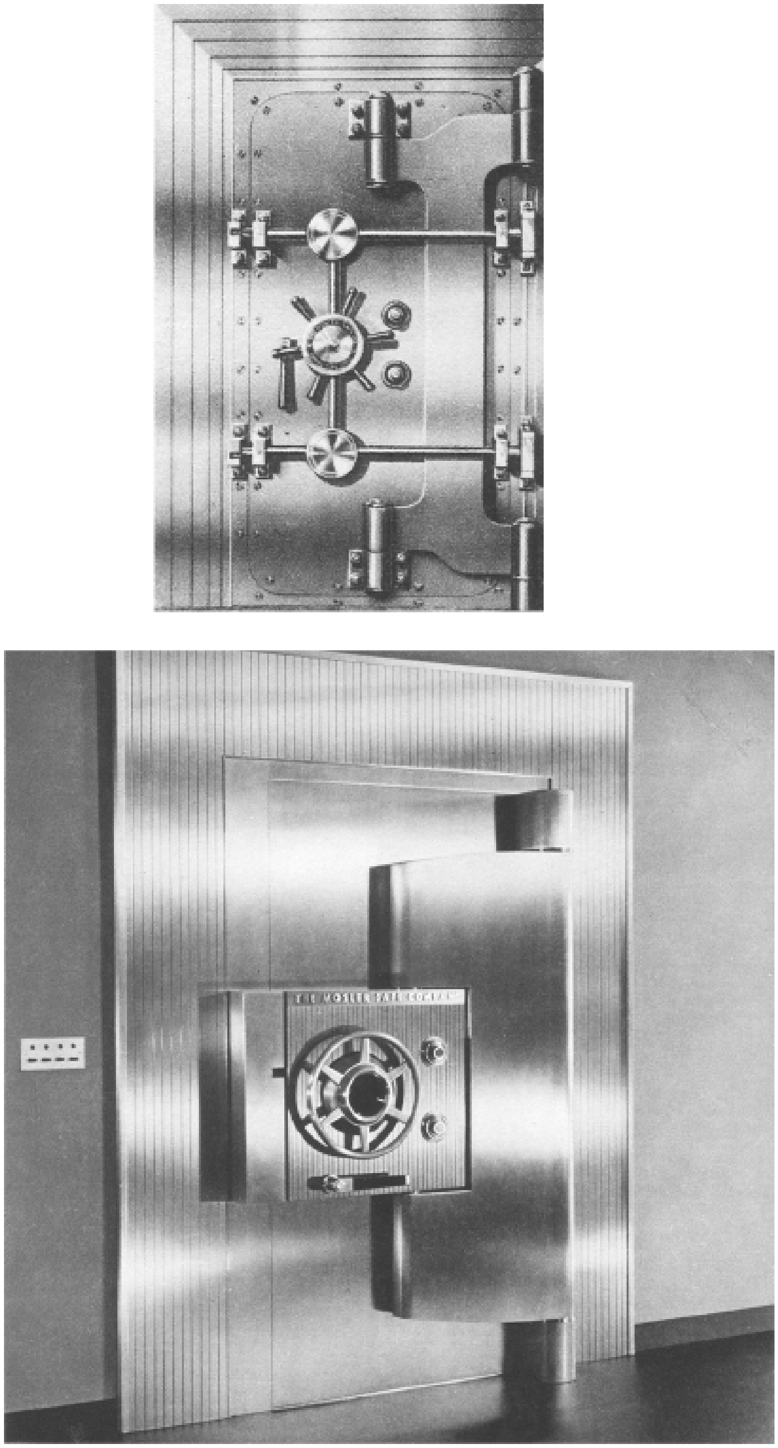
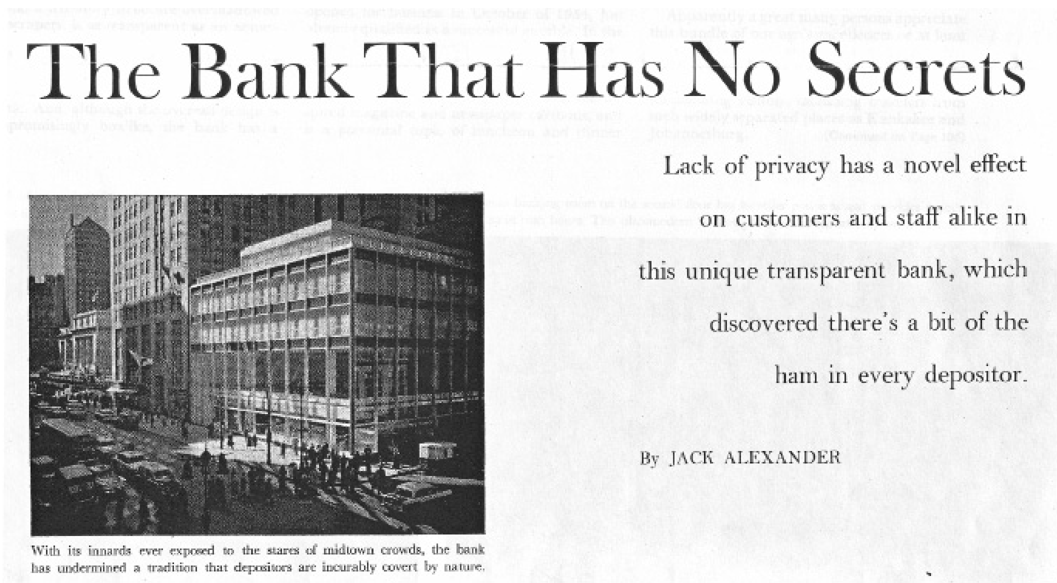


Fig. 3.28

Mosler Safe Company vault doors before (above) and after redesigning by Henry Dreyfuss. Henry Dreyfuss, *Designing for People*. New York: Allworth Press, 2003. The first edition was published in 1955.

Fig. 3.29

Vault door at night. Manufacturers Trust Company Bank. New York City. Built 1951-54. Photo by Ezra Stoller.



The Bank That Has No Secrets

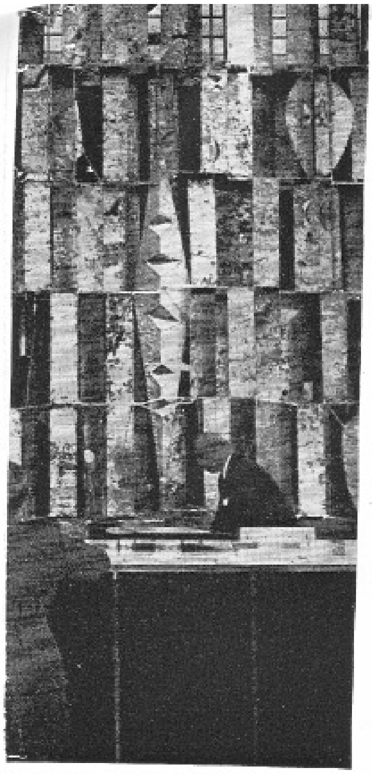
Lack of privacy has a novel effect on customers and staff alike in this unique transparent bank, which discovered there's a bit of the ham in every depositor.

By JACK ALEXANDER

With its innards ever exposed to the stares of midtown crowds, the bank has undermined a tradition that depositors are incurably covert by nature.

Fig. 3.30

Jack Alexander, "The Bank That Has No Secrets." *The Saturday Evening Post*, November 30, 1957. It says, "Lack of privacy has a novel effect on customers and staff alike in this unique transparent bank, which discovered there's a bit of the ham in every depositor."



Boos and cheers mingled when Manufacturers Trust Co. opened its new building in New York last week. Critics hooted at its "fishbowl" exterior (right). But proponents hailed the breakaway from "high-ceilinged, granite-faced mausoleums."

Bank Counts Its Money In a Glass Showcase

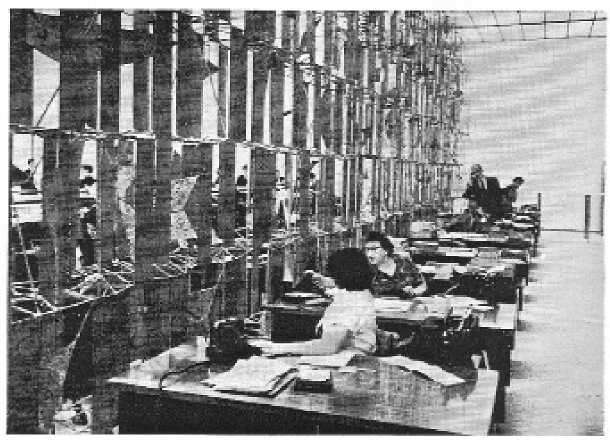
welded on a steel frame was top attraction.

Last week, New York's Manufacturers Trust Co., the nation's fourth largest bank, passed two milestones. On the same day it (1) announced that its deposits exceeded \$3-billion for the first time in its history; and (2) opened for business the newest of its 111 branch offices, at the corner of 43rd Street and Fifth Avenue (BW—Jul.31'54,p30).

It wasn't hard to see which landmark the bank considered more important. The significance of pushing beyond the \$3-billion mark was completely lost in the bank's fascination with its new building.

While a few observers hinted that this absorption verged on the narcissistic, critics and proponents agreed that Manufacturers had the most radical bank building in the country. Its archi-

EXECUTIVE OFFICES open off hallway in penthouse. Visitors use offices on left.



MASSIVE SCREEN on second floor was designed to break up floor expanse without interfering with the circulation of air. Critics likened it to an old scaffolding.

BUSINESS WEEK • Oct. 16, 1954 49

Fig. 3.31

"Bank Counts Its Money in a Glass Showcase." *Business Week*, October 16, 1954.

Fig. 3.32

Night scene. Manufacturers Trust Company Bank. New York City. Built 1951-54. Photo by Ezra Stoller.

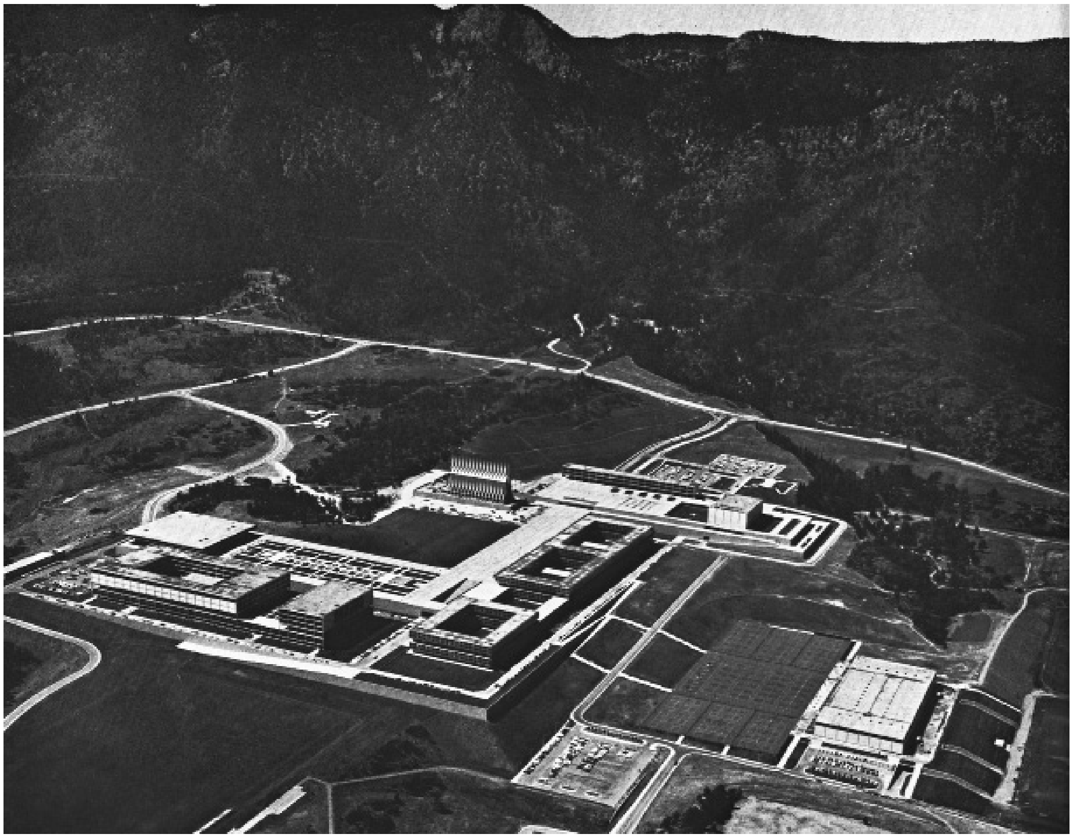


Fig. 3.33

Academic Complex, U.S. Air Force Academy. Designed 1954-57, built 1956-62. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

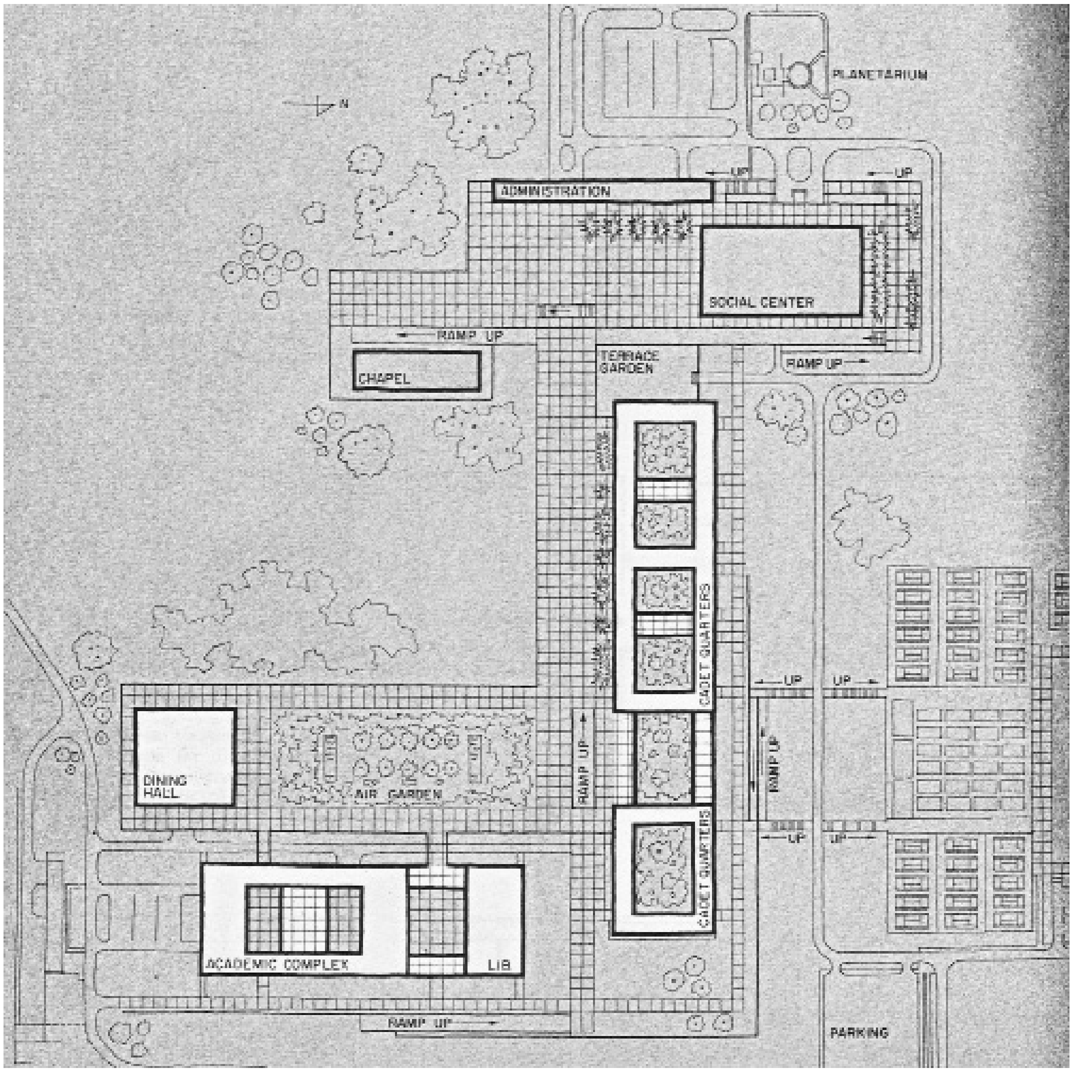


Fig. 3.34

Cadet Academic Area. U.S. Air Force Academy by Skidmore, Owings & Merrill. "U.S. Air Force Academy." *Architectural Forum* (June 1955).

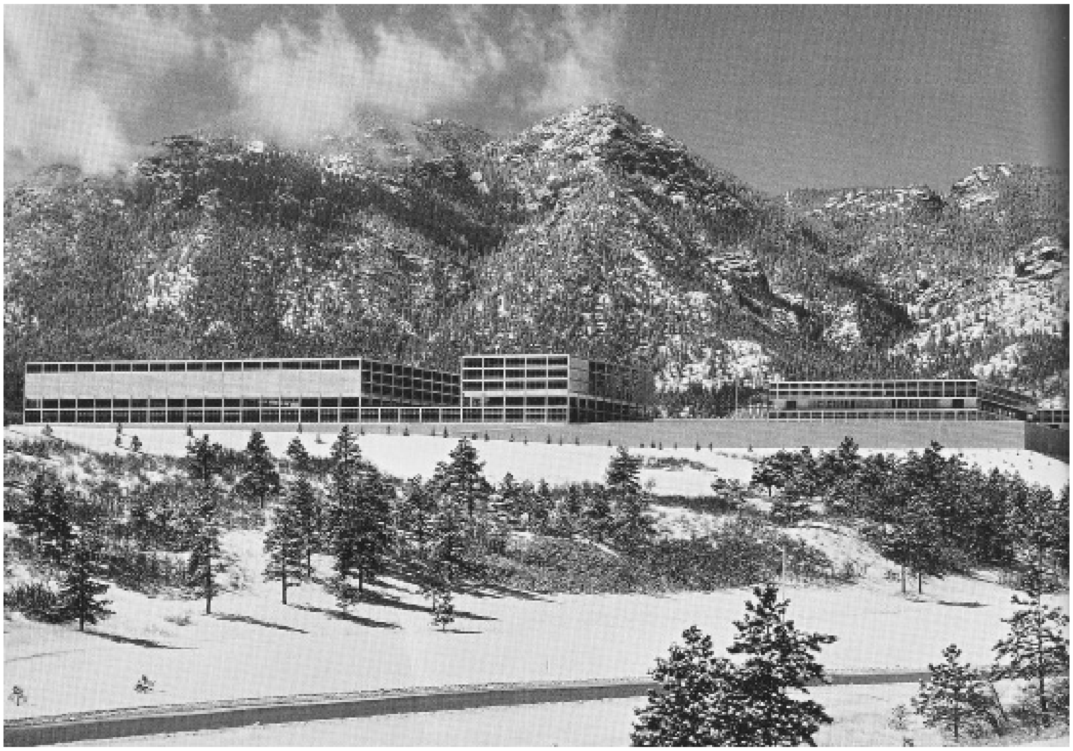


Fig. 3.35

View of Cadet Area from the East. From *Modernism at Mid-Century: The Architecture of the United States Air Force Academy*. Ed. Robert Bruegmann. Chicago: University of Chicago Press, 1994.

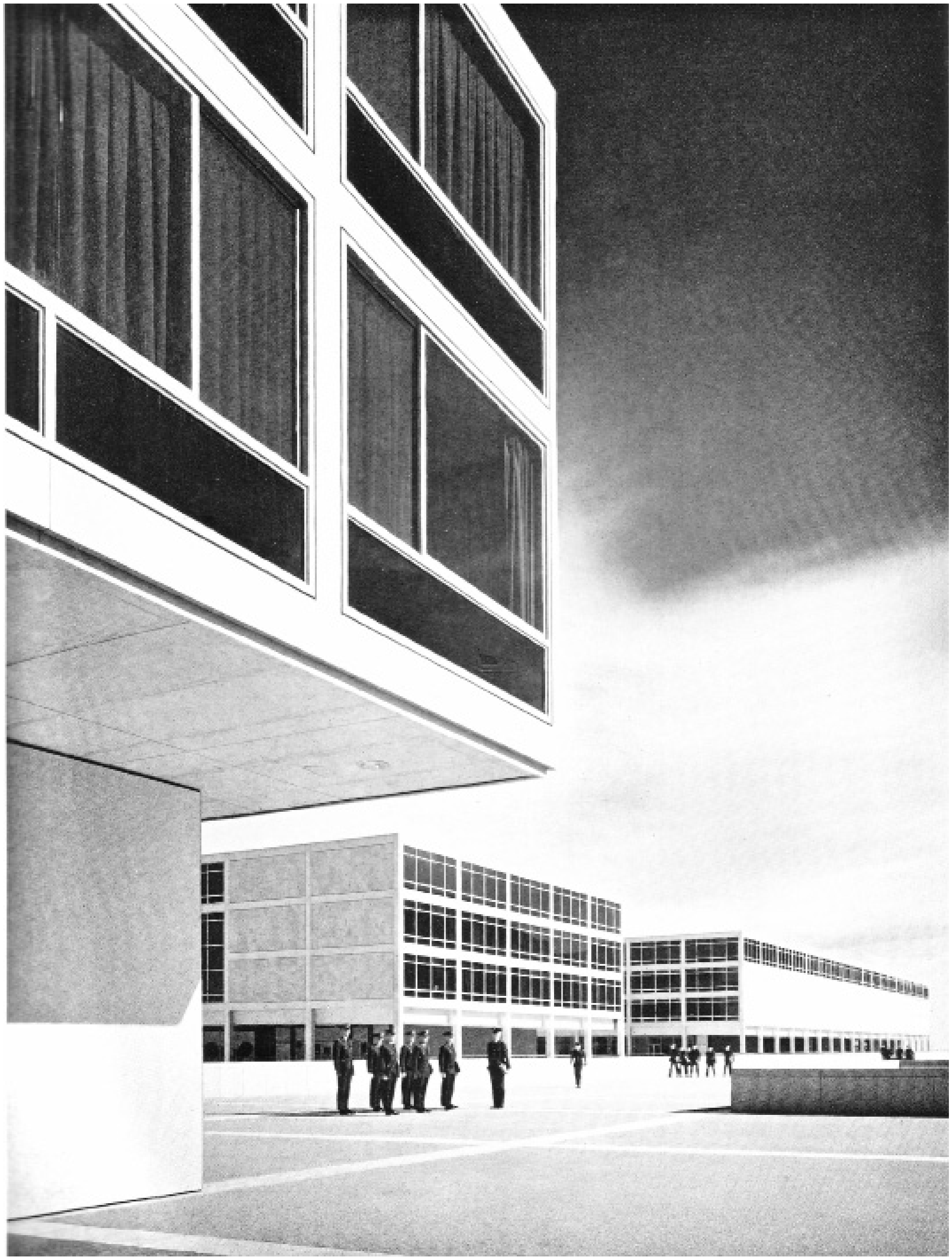


Fig. 3.36

View of Library, Classroom and Laboratory Building, from Cadet Quarters. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

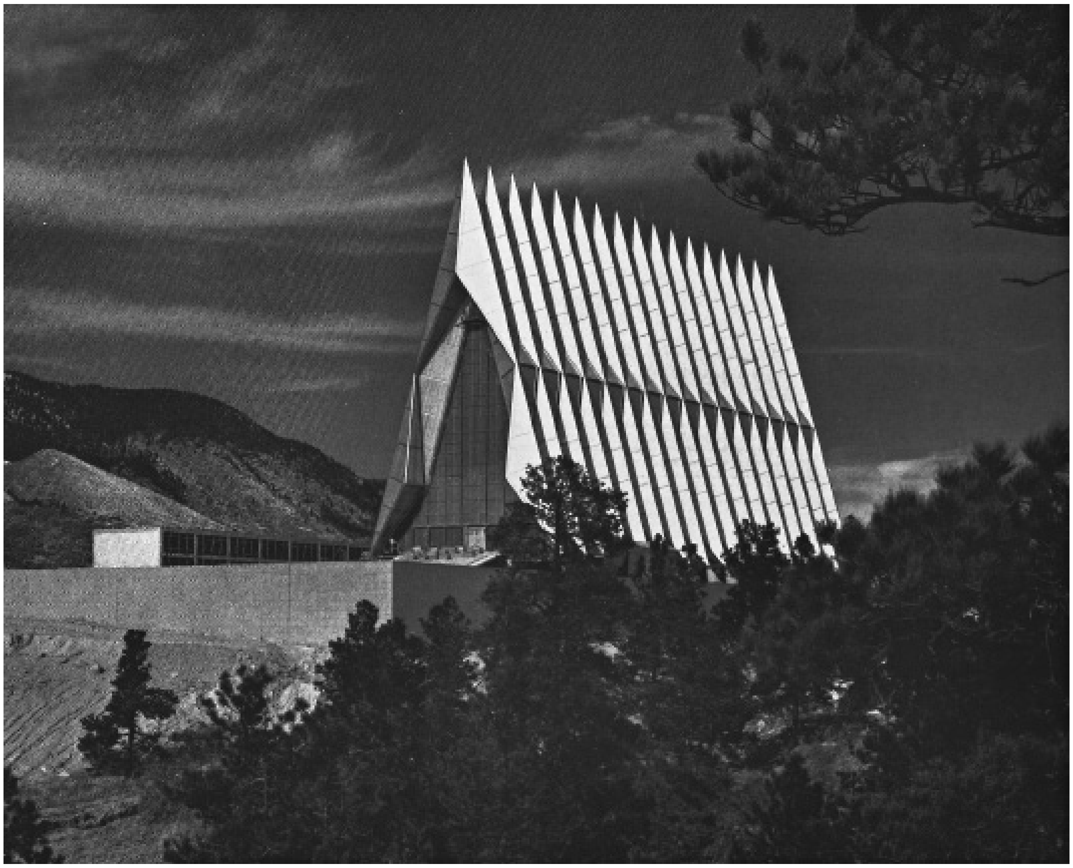


Fig. 3.37

Chapel. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

Fig. 3.38

Dining Hall. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

Fig. 3.39

Interior of Dining Hall. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

Fig. 3.40

West façade of the Dining Hall at night. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

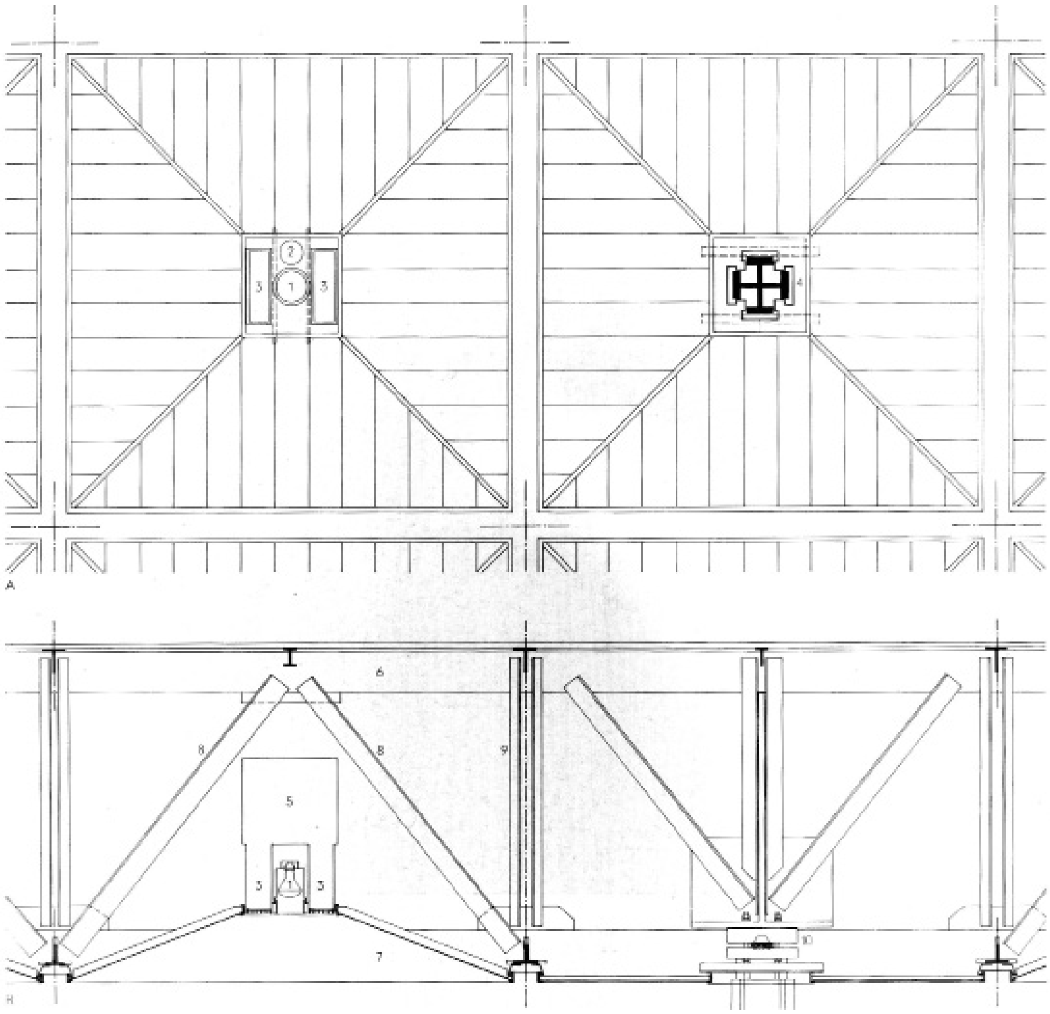


Fig. 3.41

Detail of ceiling plan and roof framing. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

Fig. 3.42

Coffee service, c. 1958. Walter Dorwin Teague Associates. From *Modernism at Mid-Century: The Architecture of the United States Air Force Academy*. Ed. Robert Bruegmann. Chicago: University of Chicago Press, 1994.

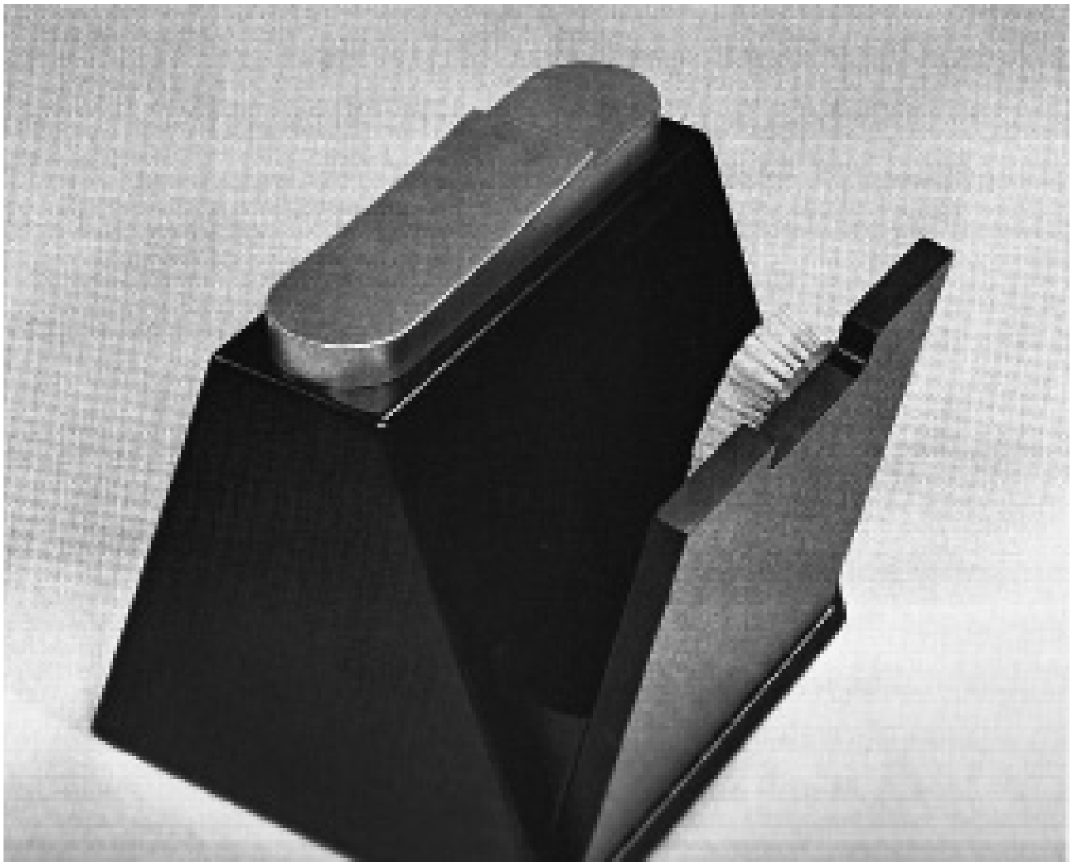


Fig. 3.43

Shoeshine stand, c. 1958. Walter Dorwin Teague Associates. From *Modernism at Mid-Century: The Architecture of the United States Air Force Academy*. Ed. Robert Bruegmann. Chicago: University of Chicago Press, 1994.

Fig. 3.44

Cadet room. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

CODE FOR A CHAIR

3500-NLR-1221611

3500 NLR	1	2	2	1 6	1	1
First four digets here indicate category: Furniture, *NLR: non-listed research (new-item)*	*General Description:* *Seating*	*Type:* *Lounge chair with arms*	*Frame Material:* *All metal*	*Flexible category (1-99) for adding new items, or showing hard-to-classify ones.* *Here means simply: 16th chair designed.*	*Upholstery material:* *Simulated leather*	*Color:* *Tan*

Fig. 3.45

13-digit IMB code. “Furnishing for Fifty Years.” *Industrial Design* (April 1958).

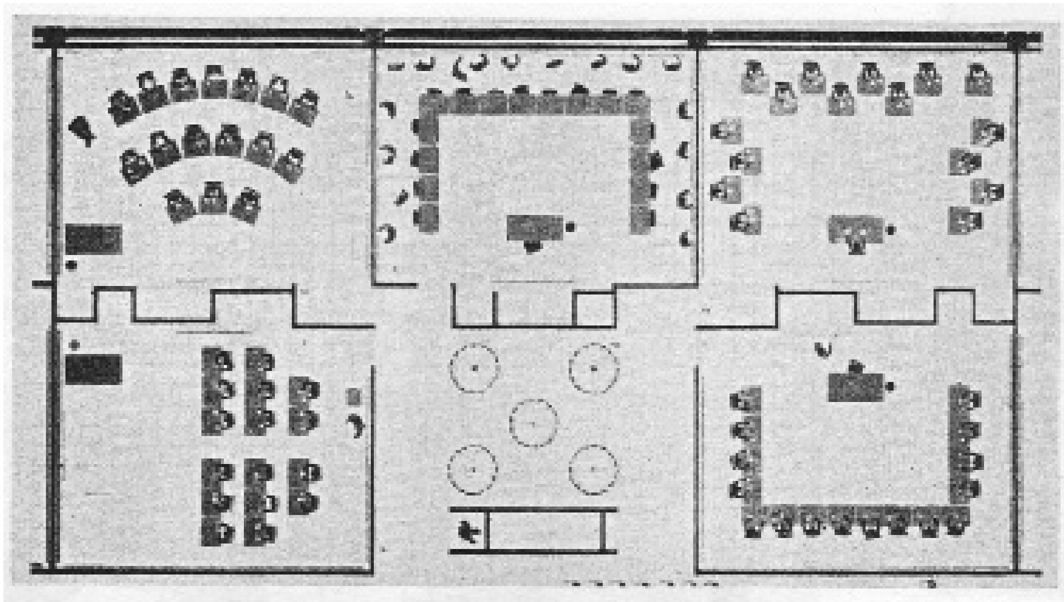


Fig. 3.46

Plan of classrooms. “Final Schematics for Air Force Academy.” *Architectural Record* (July 1956).

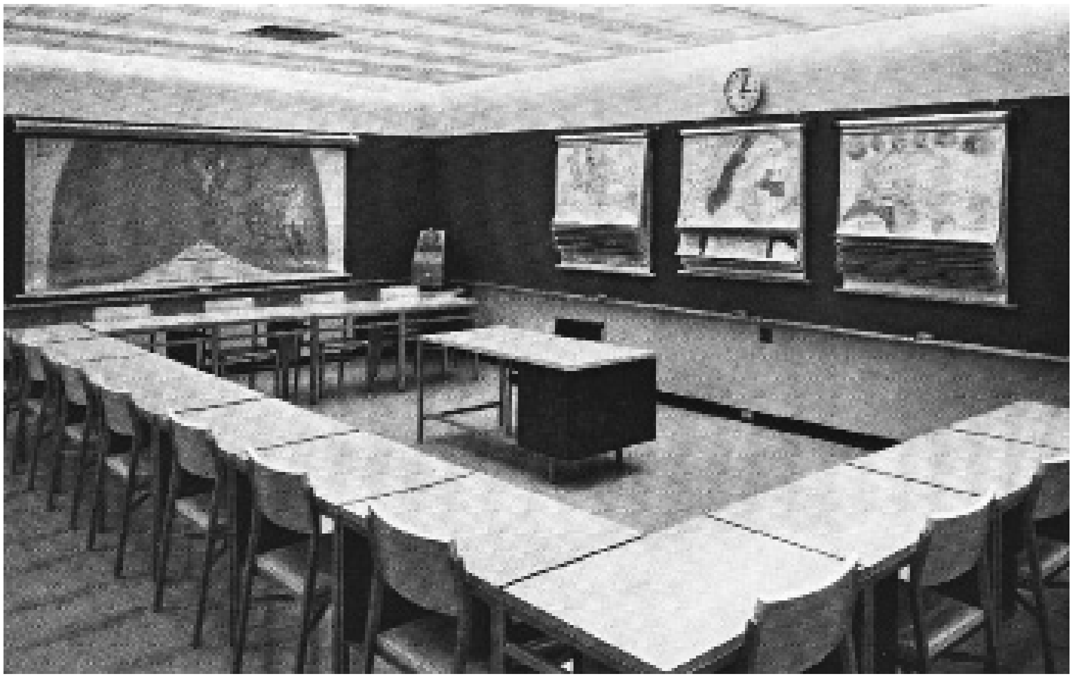


Fig. 3.47

Typical classroom. From Ernst Danz. *Architecture of Skidmore, Owings & Merrill, 1950-1962*. London: The Architectural Press, 1963.

Fig. 4.1

Special issue on Skidmore, Owings & Merrill. *Bauen und Wohnen* (April 1957).

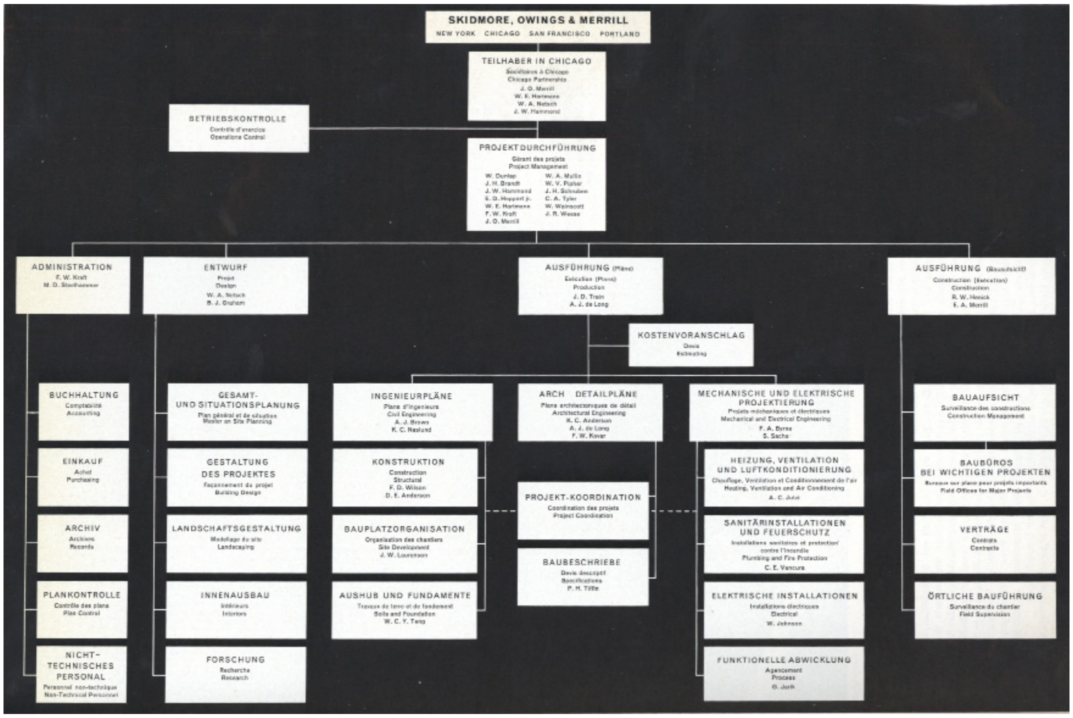


Fig. 4.2

Organizational Chart of the S.O.M. Chicago Office. *Bauen und Wohnen* (April 1957).

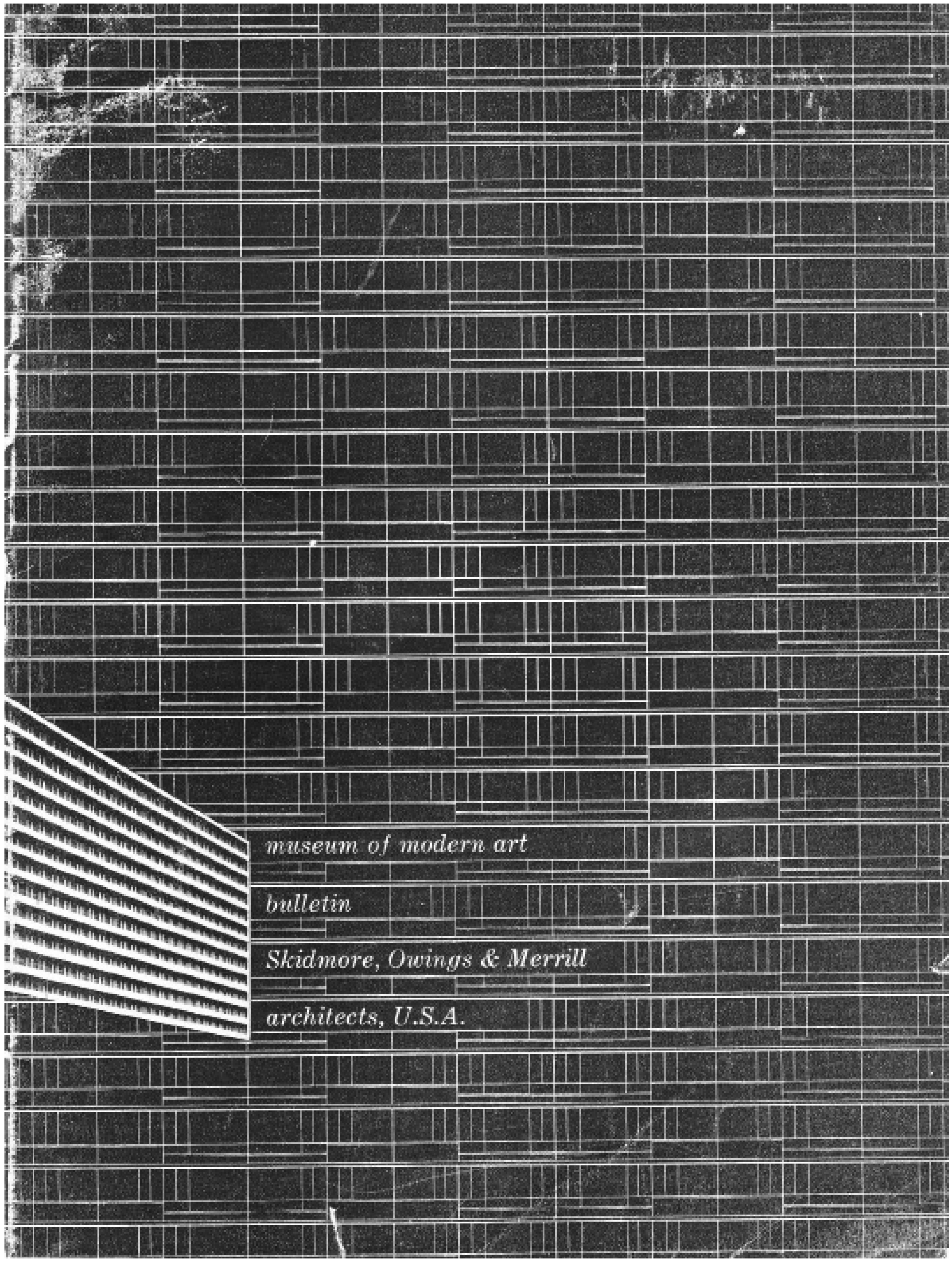


Fig. 4.3

"Skidmore, Owings & Merrill, Architects, U.S.A." *Museum of Modern Art Bulletin* (Fall 1950).

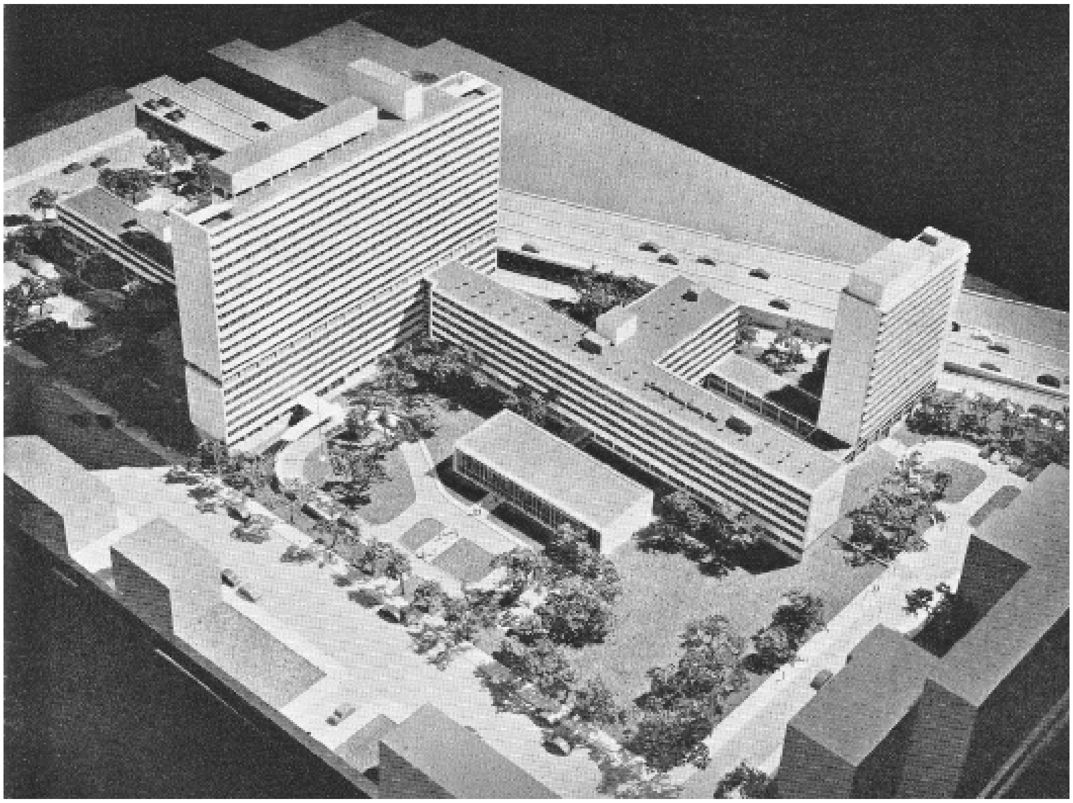


Fig. 4.4

New York University-Bellevue Medical Center. “Skidmore, Owings & Merrill, Architects, U.S.A.” *Museum of Modern Art Bulletin* (Fall 1950).

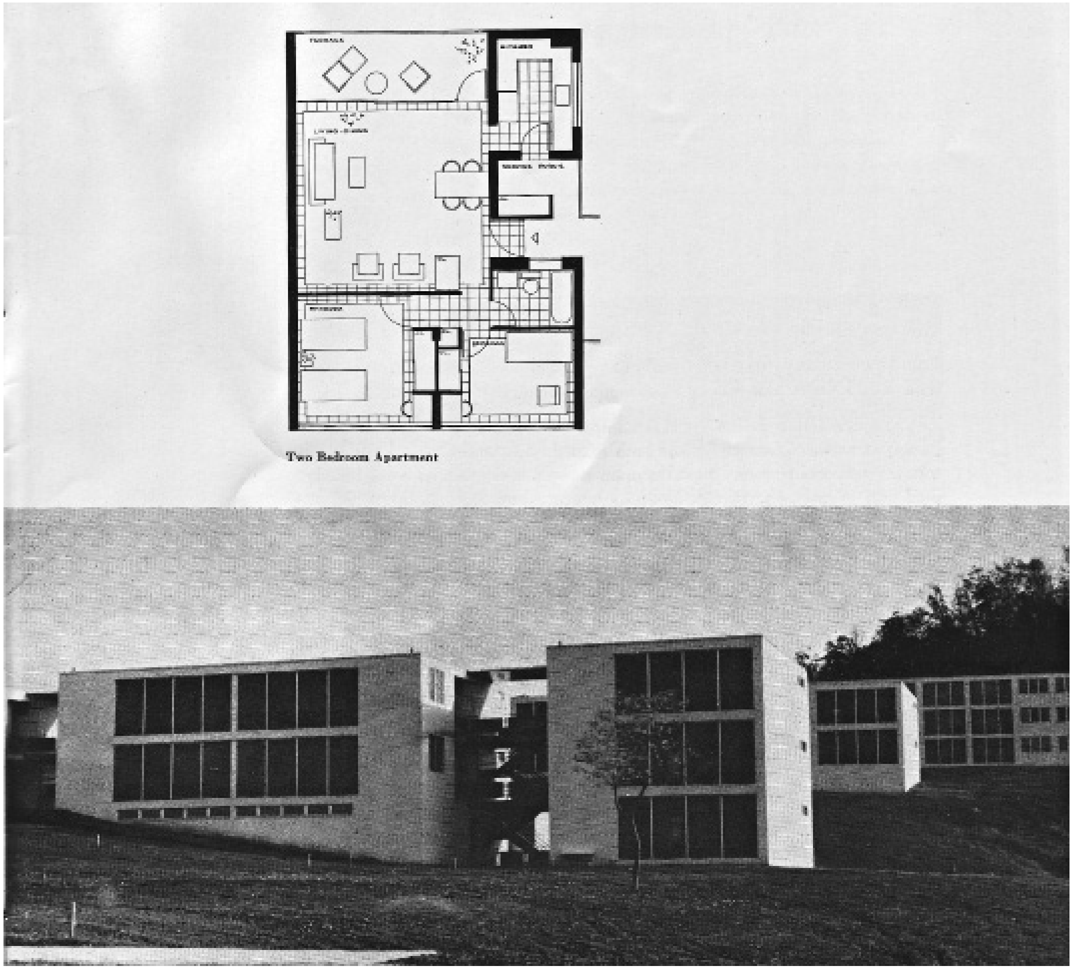


Fig. 4.5

Garden Apartments, Oak Ridge, Tennessee (1950). “Skidmore, Owings & Merrill, Architects, U.S.A.” *Museum of Modern Art Bulletin* (Fall 1950).

Fig. 4.6

Terrace Plaza Hotel, Cincinnati, Ohio. Built 1946-48. Nicholas Adams, *Skidmore, Owings & Merrill: SOM Since 1936*. Milan: Electa Architecture, 2007.

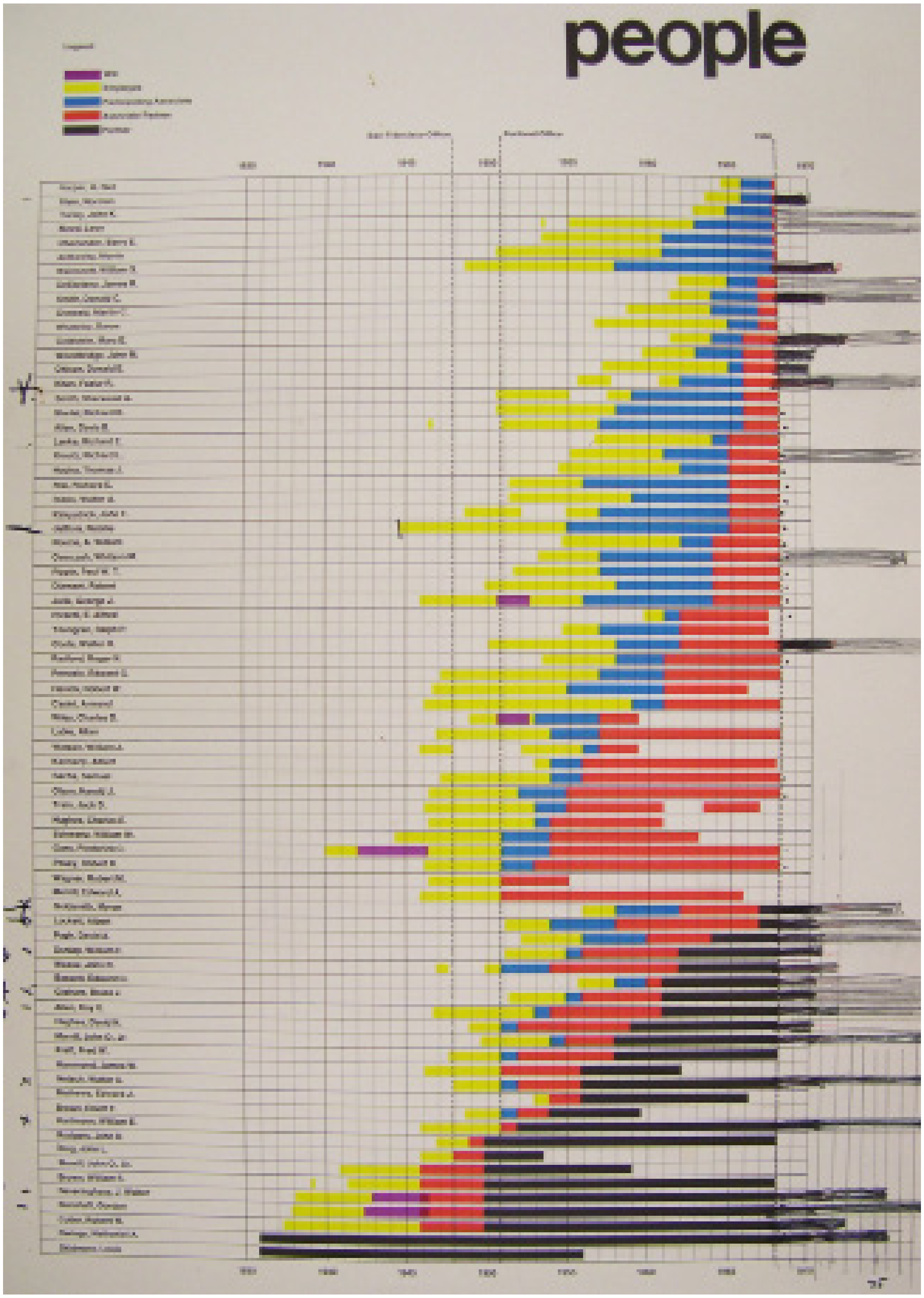


Fig. 4.7

Chart of S.O.M. Partners, c. 1966. Nathaniel A. Owings Papers. Library of Congress.

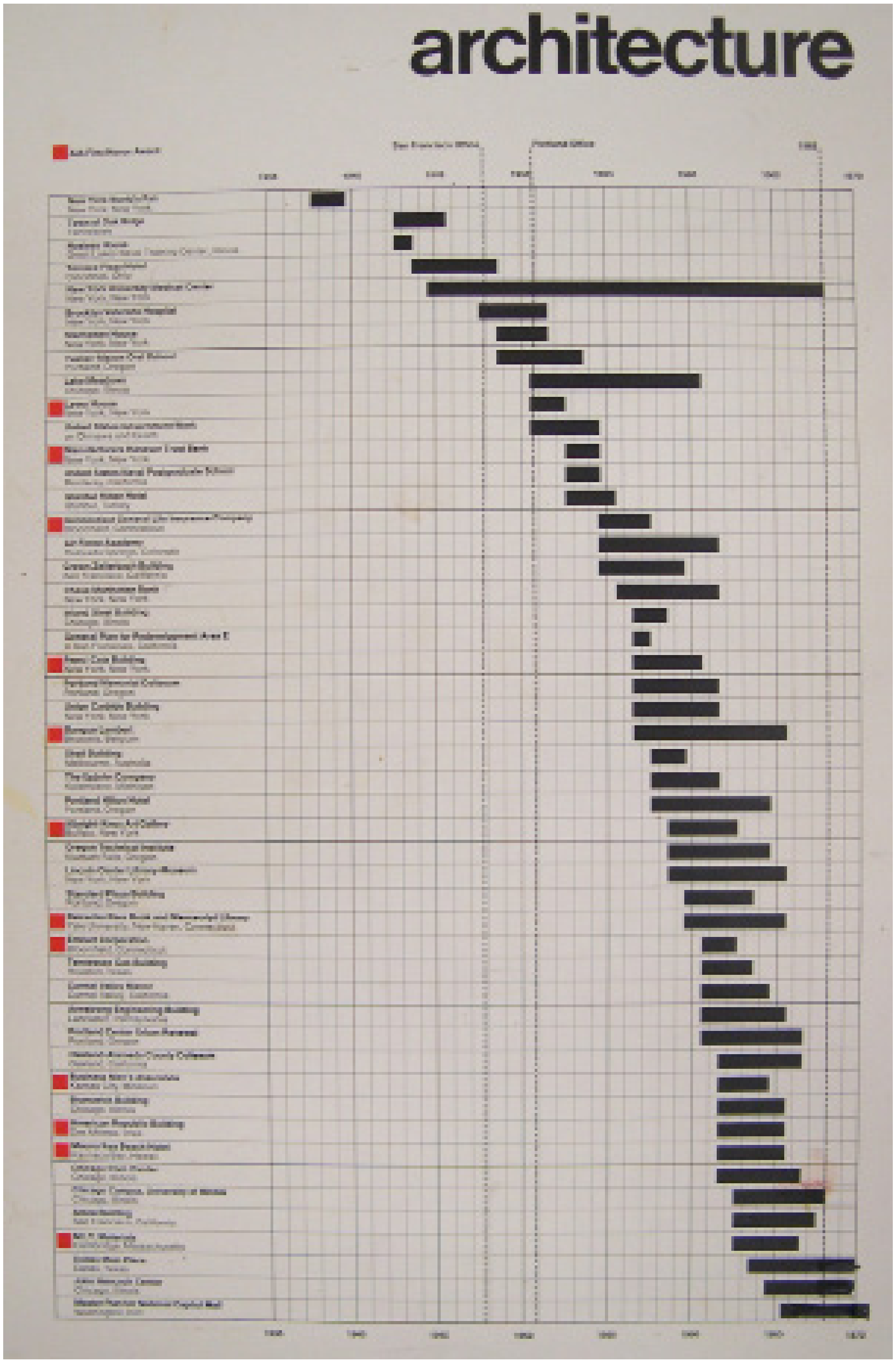


Fig. 4.8

Chart of S.O.M. Buildings, c. 1966. Nathaniel A. Owings Papers. Library of Congress.

Fig. 4.9

Partners' meeting in 1957. Louis Skidmore at the extreme right. (Clockwise from Skidmore) William E. Hartmann, Nathaniel A. Owings, John O. Merrill, Gordon Bunshaft, James W. Hammond, Robert W. Cutler, John B. Rodgers, Walter A. Netsch, Jr., J. Walter Severinghaus, William S. Brown, Elliott Brown, Edward J. Mathews, and S.O.M. lawyer Marshall Grosscup Sampsell.