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Design and Profit: Architectural Practice in the Age of Accumulation

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by

Aaron F. Cayer

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ABSTRACT OF THE DISSERTATION

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Professor Dana Cuff, Chair

During the last three decades of the twentieth century, architects in the United States expanded and made fluid the geographical, professional, and economic scope of their practices. In many large firms, architects were no longer fixed to their drafting tables upon which they produced drawings for single buildings, nor were they defined by work in a single firm. Instead, they worked in multinational and multidisciplinary corporations, comprised of several diverse firms, and their work supported the production of entire cities—from buildings to infrastructure to the financial systems that made each possible. This dissertation examines the historical emergence of this expanded form of architecture practice, including the ways in which these new definitions and compositions of work precipitated, and were precipitated by, a series of broad, yet interrelated social, political, and economic shifts in the US between 1960 and 1990.

This research uses the Los Angeles-based architecture and engineering firm Daniel, Mann, Johnson, & Mendenhall (DMJM) as a lens through which to view these transformations. Initially formed as a three-person architecture partnership in 1946 in Santa Maria, California, DMJM emerged as a multinational corporate conglomerate, comprised of nearly a dozen diverse

subsidiary firms beneath it, and it was responsible for the formation of what would become the largest firm in the history of architecture and engineering by the twenty-first century, named AECOM. Out-pacing a number of large firms that began to falter during the 1980s, DMJM maintained stability by acquiring and developing firms that broadened the domain of architectural work—from architecture to engineering, real estate to data processing, and from urban planning to finance. This research examines the particular ways in which architects expanded their roles, and how, as a result, the shape of architectural practice began to take on that of an urban economy. Within this new economy of work, architects began to pull new types of urban infrastructure into the fold of architecture, including government-sponsored military bases, ballistic missile facilities, and wastewater treatment plants.

While a rich body of historical scholarship has described how the prominence of large architecture firms after World War II were results of the organizational and collaborative aspirations of corporate capitalism, this dissertation exposes a pivotal juncture within the history of American architectural practice, when architecture firms began to both exemplify and reinforce a shift from capitalism to late capitalism. An unrestrained and unabashed pursuit of profit was coupled with a steady hand of Cold War state patronage, and architecture firms were fragmented and re-combined with others in new ways. DMJM's history reveals how the possibility of conglomeration for architecture—the act of acquiring firms increasingly unrelated to building design—was predicated on a culture of practice in which architects were required to view themselves as social and economic equals, rather than as superiors, to a broader range of urban practitioners; as a result, they were able to make legible, as well as to increase, the economic and political value of their labor.

The dissertation of Aaron F. Cayer is approved.

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Above all, this dissertation is dedicated to my parents. I was reminded throughout this project that, if not for the many rural papermill towns like the one in which they both expend their manual labor in order to support me, then there would be no architectural documents, drawings, or books for me to study, nor pages upon which to write. They have taught me the meaning of work, dedication, and love in ways that even books could not; they power the light that guides all that I do.

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CHAPTER 1

Introduction

The art of progress is to preserve order amid change and to preserve change amid order.
-Alfred North Whitehead[1]

On a dreary morning in August of 1949, three tense architects gathered in their cramped office in the Granada Buildings of Los Angeles to assess the status of their wilting three-year-old partnership. Tall stacks of unpaid bills teetered unsteadily each time an architect dashed by them, and the founding partners returned home at the end of each week with their heads hanging low and, if lucky, fifty dollars in their pockets. As one business journal recalled, it appeared to be only a matter of time before the so-called "profit-sapping" firm would "explode apart."[2] The firm was Daniel, Mann, & Johnson, Architects (DM&J), and, flashing forward to the 2010s, the partners would be stunned to know that they would be, in many ways, responsible for the formation of the largest architecture and engineering firm in the history of American architecture practice, named AECOM, as measured in 2017 by its 90,000 employees, 18 billion dollars in annual revenue, and 680 million dollars in annual profit.[3] Beyond these markers of economic merit, the significance of AECOM to the history and theory of architecture is further expounded by the firm's location and prominence in the city of Los Angeles itself. Since 2016, the firm's corporate logo, comprised of five bold white letters, A-E-C-O-M, has been displayed from the

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[1] Alfred North Whitehead was an English mathematician and philosopher whose quote was printed inside the cover of: *Company General Brochure: A Presentation of Work of Daniel, Mann, Johnson, and Mendenhall*, 1967. Stanley A. Moe papers, Huntington Library, San Marino, CA.

[2] This opening vignette is based on both oral histories as well as the account of the firm written in: "Profile of a New Kind of Manager: How to Pack Pleasure and Profit into a Partnership," *Management Methods* (September 1957), p. 28.

[3] AECOM, *Imagine It. Delivered. 2017 Annual Report* (Los Angeles, CA: AECOM, 2018). AECOM has, since 2009, maintained a position as the largest architecture and engineering firm in the US by revenue.

top of the two-hundred-foot-tall One California Plaza in downtown Los Angeles in apparent confirmation that the practice of architecture was no longer distinguishable within an otherwise homogeneous constellation of profit-seeking signifiers: Union Bank, US Bank, CTBC Bank, Citi Bank, Ernst and Young, First Republic, Aon, City National Bank, Manufacturers Bank, Open Bank, Wells Fargo, Paul Hastings, AECOM (*Figure 1.0*).

While the turn from economic precarity to economic prominence is not unfamiliar to histories of American architectural practice, the possibility of a firm such as AECOM—a multinational "corporate conglomerate" comprised of nearly fifty diverse firms, ranging in service from architecture to finance, and publicly traded on the New York Stock Exchange as a Fortune 500 company—was the result of a series of important political and economic shifts in the US between 1960 and 1990. This research examines these shifts, including those in the nature of capital accumulation typified by the rise of a post-Fordist economy, and it identifies the ways in which these changes simultaneously inflected, and were inflected by, the composition, scale, and scope of late twentieth-century architecture firms. Growing slowly by developing and acquiring a diverse array of individuals and firms since its founding in 1946, DM&J (re-named DMJM in 1950) emerged as a responsive capitalist actor whose initial architectural stances were produced by a need to brace against the volatilities of a post-World War II economy. Like many optimistic postwar architecture firms, the enduring strength of DMJM during the second half of the twentieth-century was predicated on the willingness of its architects to embrace new roles, revise the structure of their firm, and adapt their services to the shifting political-economic demands. The firm was first structured as a nineteenth-century partnership and found itself in desperate need of managerial expertise to position it toward economic stability by the end of the 1940s. By 1960, the partnership incorporated, and its services had expanded to include engineering, planning, and construction management; by the 1970s, the term "conglomerate" surfaced within the firm, used to describe a growing "family" of affiliated and subsidiary firms—ranging in service from architecture to engineering to real estate to computer systems to cosmic X-rays—that were developed or acquired beneath the firm's corporate umbrella; by the 1980s, the firm had become a model of diversified practice that was studied not only by other architecture firms, but also by accounting and law firms, oil companies, and the US military; and by 1990, DMJM had become part of, as well as a model for, an entirely new multinational corporate conglomerate of architecture and engineering firms, named AECOM, which was unprecedented in its composition, scale, scope, and capacity.[4]

While a growing body of historical scholarship has revealed how post-World War II corporate capitalism was propelled by architecture firms that produced corporate headquarters and consumable images depicting work as depicted clean, white, and orderly, little scholarship has fully examined the cultural transformations taking place within large architecture firms after the 1960s, when capitalist systems based on industrial modes of production/consumption were replaced by competition-driven systems of finance and pursuits of profit that were set free from demand. Amplified by Ronald Reagan and Margaret Thatcher's theories of free-market economics, as well as a double strike of economic recessions in the US during the 1970s and 1980s, these shifts in the nature of capitalism were compounded by changes to the role of the architecture profession itself. Anti-market and anti-profit principles, espoused by the American Institute of Architects (AIA) since the nineteenth century, were abruptly challenged during the

[4] DMJM's subsidiaries as reported in *Engineering News-Record* in 1982 included: American Science & Engineering, Co.; Arctic Slope Technical Services, Inc.; Associated Design Planning & Art, Inc; DMJM International; DMJM/Thomson Ltd; Development and Technology Consultants, Inc., Philippines; Logicomp, Corp; Real Estate Resources; Technical Management Services, Inc.; Technical Management Services Arabia, Ltd, Saudi Arabia; TMSI Contractors, Inc.; Wilhamp, Inc. See: "The Top 500 Design Firms," *Engineering News-Record* (May 1982), p. 95.

1970s, and architects especially in large firms, such as those at DMJM, began to expand their practices by viewing themselves not only as designers of increasingly large and complex buildings, but also as designers of speculative and profit-seeking enterprises. While there were many firms that resisted the changes in the nature of capitalism during the latter half of the twentieth century and consequently disassembled and dispersed, including The Architects Collaborative (TAC) in Massachusetts in 1995 and Caudill Rowlett and Scott (CRS) in Texas in 1994, there were others, including DMJM, Albert Kahn Associates, and Perkins & Will, that viewed the particular changes in the definition of professionalism, in the shifting nature of capitalist production, and in the expanded potentials of architectural labor as opportunities to establish practices that could both endure, as well as bolster the political and economic value of their labor.

This dissertation examines the ways in which the rise of multinational corporate conglomerates epitomized this transition. While the conglomerate represented the advent of a particular kind of business structure that was popularized during the 1960s and 1970s by industrial organizations that merged with and acquired other firms with diverse and commonly unrelated functions, this research reveals how conglomeration in architecture described both a particular business structure as well as a constructivist culture of practice. The multi-firm structure implied by corporate conglomeration, as well the expanded scope of architectural work it made possible, was predicated on a view of practice in which architects willingly embraced new roles beyond the designing of buildings, and they positioned themselves as social and economic equals—rather than as superiors—to a broader range of urban practitioners. As a result, conglomerate practices not only enabled architects to expand and make fluid what was historically construed as architectural work, but it also allowed them to make legible the ways in which architects were inextricably embedded in, and contributors to, urban political economies.

Architecture Practice as a Business

The identity of the architect in the United States has been defined historically by internal contradictions that have limited the ways in which architectural work could be connected to the broader structures and processes of political economies. Since first codified as a bonafide profession during the second half of the nineteenth century, American architects were caught between a series of well-known, yet conflicting identities: professionals committed to public service and art above profit and business; businesspersons interested in profit in ways that defy professionalism; or artists struggling to define and obtain disciplinary and cultural recognition above all else. These historical contradictions were, in many ways, deeply entrenched and inevitable—at least until the 1970s. The model of the profession that was imported from eighteenth-century British mercantilism was based on a premise of so-called "gentlemen" architects, whose social obligations to both their clients and builders meant that they were to be financially and economically "disinterested" practitioners. This position was made possible in Europe by the presence of sustained state and private patronage, as well as by a tendency among architects to earn alternative sources of income beyond architecture.[5] In the United States, the profession established itself by adopting a similar position of architects as white, disinterested

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[5] On the history of the professional architect in Britain, see: Barrington Kaye, *The Development of the Architectural Profession in Britain* (London: Allen & Unwin, 1960); Frank Jenkins, *Architect and Patron* (London: Oxford, 1960), pp. 80–159. On the history of architectural patronage in the US, see: Magali Sarfatti Larson, "Patronage and Power," in *Reflections on Architectural Practices in the Nineties*, ed. William S. Saunders (Princeton, NJ: Princeton Architectural Press, 1996), pp. 130–43; and Magali S. Larson, "Emblem and Exception: The Historical Definition of the Architect's Professional Role," in *Professionals and Urban Form*, ed. Judith Blau, Mark La Gory, and John S. Pipkin John (Albany, NY: SUNY Press, 1983), pp. 49–86.

gentlemen; however, unlike in Europe, architects were entirely market-driven, since sustained state and private patronage was far less common.[6] Upon its founding in 1857 and the approval of its first formal Code of Ethics in 1909, the AIA emphasized public service and art over business and profit, declared that competition between practitioners was anti-professional and unethical, and argued that standard fee-schedules would help to instill anti-market principles.[7] These stances remained largely unchanged until the 1970s, and thus to be interested in capitalist systems and business was to diminish one's significance as a professional, as sociologist Talcott Parsons asserted more broadly about professions in the 1930s. "By contrast with business," Parsons argued, "the professions are marked by 'disinterestedness.' The professional man is not thought of as engaged in the pursuit of his personal profit, but in performing services to his patients or clients, or to impersonal values like the advancement of science."[8] Historians and theorists of architecture have since revealed that the perpetual downplaying of profit motives over the course of the late nineteenth and twentieth-century, as well as an unrelenting disdain for those interested in profit above art and public service, contributed to low fees and salaries among architects, limited the ways in which their work could be viewed as affective in its relationship to political-economies, and prohibited architecture from being understood as a bonafide realm of

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[6] On the architect as gentlemen, see: Andrew Saint, "The Architect as Gentleman" in his *The Image of the Architect* (New Haven: Yale University Press, 1983), pp. 96-114; and John M. Dixon, "A White Gentlemen's Profession?" *Progressive Architecture* 75, no. 11 (November 1994), pp. 55–61. On the history of the architect as businessman, see: Mary N. Woods, *From Craft to Profession: The Practice of Architecture in Nineteenth-Century America* (Berkeley: University of California Press, 1999); Andrew Saint "The Architect as Businessman: The United States in the Nineteenth-century," in his *The Image of the Architect*, pp. 72-95; and Jay Wickersham, "From Disinterested Expert to Marketplace Competitor: How Anti-Monopoly Law Transformed the Ethics and Economics of American Architecture in the 1970s," *Architectural Theory Review* 20, no. 2 (2015), pp. 138–58.

[7] Magali Sarfatti Larson, *The Rise of Professionalism: A Sociological Analysis* (Berkeley: University of California Press, 1977). See especially Chapter 5, "Market and Anti-Market Principles."

[8] Talcott Parsons, "The Professions and Social Structure," *Social Forces* 17, no. 4 (May 1939), p. 458.

cultural production—a view predicated on the accepting of individual motivations for practice even as they may diverge, disagree, or compete.[9]

Despite the professed layers of contempt for business, many American architects still came to be viewed as prominent businessmen during the nineteenth century—marketed by the sizes of their firms, the emerging divisions of labor used in practice, and the scale of the buildings they were able to produce. As architectural historian Mary Woods has argued, in order to establish firms that could endure, American architects were required to actively tune the structures of their private practices to the market economy and to readily adapt them in accordance with the shifting means of capital accumulation.[10] At the turn of the twentieth-century, one New Jersey architect writing to a broad professional audience concluded that "the architectural opportunities fall to those who are preeminent for business rather than artistic ability, and thus it is they who build the architecture of the country, good, bad or indifferent. The architect must be a business man first and an artist afterwards."[11]

This view of the architect as a businessman was codified during the era of monopoly capitalism of the late nineteenth century, when industrial organizations consolidated and merged into increasingly larger ones, and business partnerships in architecture emerged as alternatives to sole proprietorships, such as studios or ateliers. Private partnerships suggested a departure from Beaux-Arts-era ateliers; they enabled architects to join with individuals who might offer complementary skills, such as an engineer or business manager, and they supported the

[9] See: Dana Cuff, "The Ethos and Circumstance of Design," *The Journal of Architectural and Planning Research* 6, no. 4 (1989), pp. 305–20; Larson, *The Rise of Professionalism*; and Peggy Deamer, "Work," *Perspecta 47: Money*, (2014), pp. 27–39. The description of cultural production is based on Pierre Bourdieu's concept, developed in his *The Field of Cultural Production: Essays on Art and Literature* (New York: Columbia University Press, 1993).

[10] Woods, *From Craft to Profession*, p. 83.

[11] J. F. Harder, "Architectural Practice--an Art and a Business," *The Brickbuilder* 11, no. 4 (April 1902), pp. 74–77.

transformation of architecture firms into so-called "big businesses." In New York, George B. Post's small debt-laden and student-dependent practice, formed in 1867, was restructured as a partnership, complete with what historian Diana Balmori has described as a "modern office" that allowed work to be conducted more quickly and architects and draftsmen to work on multiple commissions simultaneously, such as the Western Union Telegraph Building during the 1870s.[12] While Post's firm grew to a size of sixty people by the end of the nineteenth century, other large-scale partnerships, including McKim, Mead & White in New York City surged to an exceptionally large staff of 110 by the panic of 1893, while in Chicago, William Holabird and Martin Roche's 1880 partnership, Holabird and Roche, swelled to forty by 1890, and Daniel Burnham and John W. Root's partnership, Burnham and Root, had twenty-four. Moreover, by the early 1900s, Daniel Burnham & Co., which superseded Burnham and Root after Root's death in 1891 grew to a size of 180 by 1912.[13] However, large partnerships even after World War I were rare, as less than .1 percent of American practices by 1920 were comprised of more than eighty people, compared to ninety-seven percent of firms that employed less than twenty.[14] Among the most pronounced exceptions was the later partnership, Skidmore, Owings, and Merrill, initially formed in 1936 in Chicago, which ballooned to an incomparable size of 1,000 by 1958.[15]

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[12] See: Sarah Bradford Landau, *George B. Post, Architect: Picturesque Designer and Determined Realist*, (New York, N.Y: Monacelli Press, 1998); Diana Balmori, "George B. Post: The Process of Design and the New American Architectural Office (1868-1913)," *Journal of the Society of Architectural Historians* 46, no. 4 (December 1987), pp. 342–55; and Winston Weisman, *Journal of the Society of Architectural Historians* 31, no. 3 (October 1972), pp. 176–203.

[13] Woods, *From Craft to Profession*, p. 119.

[14] Turpin C. Bannister, *The Architect at Mid-Century*, vol. 1 (New York: Reinhold, 1954), p. 63.

[15] Bernard Michael Boyle, "Architectural Practice in America, 1865-1965--Ideal and Reality," in *The Architect: Chapters in the History of the Profession*, ed. Spiro Kostof (Berkeley and Los Angeles: University of California Press, 2000), p. 327.

Partnerships were especially suitable for architects because they were emboldened by the named individuals who formed them, and they enabled architecture, despite the addition of engineers and businessmen, to remain as a single frame of work, often within a single geography. However, despite these efforts, many architects-as-businessmen refuted the label of business that came to be associated with partnerships, and some, including Beaux-Arts-trained Richard Morris Hunt and Henry Hobson Richardson, argued that their firms were still "ateliers" despite a clear emphasis on business and efficiency. Others, such as Stanford White, Daniel Burnham, William Holabird, and Martin Roche, quietly engaged in real estate transactions and invested in many of their client's projects in exchange for stocks, demonstrating that they were, at least behind the veil of their partnerships, interested in economic markets and economic theories.[16] Therefore, while the rise of private partnerships encouraged a culture of big business that perforated the omnipresent layer of disdain for commerce by the profession, architects remained limited in their ability to become pure businessmen and truly unabashed in their interest in economic markets, economic theory, and profit.

After World War II, concerns about personal liability caused architects to embrace corporate structures of practice, which allowed groups of practitioners, rather than named individuals, to be legally recognized by states as single entities. As comparatively anonymous enterprises structured for maximum efficiency and expansion, corporations supported multiple economic functions, boasted collaborative and strong managerial capacities, and empowered architects to pursue work across multiple geographic areas.[17] In addition to reducing personal

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[16] Woods, *From Craft to Profession*, pp. 168-169.

[17] See especially: Adolf A. Berle, *The Modern Corporation and Private Property [1932]* (New Brunswick, N.J., U.S.A: Transaction Publishers, 1991); Peter F. Drucker, *Concept of the Corporation* (New York: The John Day Company, 1972); Alfred D. Chandler, *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, Mass.: Belknap Press of Harvard Univ. Press, 2002).

liability, corporations also provided greater tax benefits than partnerships, as well as a new means by which architects could transfer ownership of their firms beyond the founding individuals.[18] While an increasing number of architecture historians have carefully examined the impacts of corporate capitalism on postwar architecture, including the ways in which architecture firms produced consumable corporate images for a wide range of enterprises during the 1950s, from Lever Brothers to General Motors to McDonald's, in practice, most architecture firms resisted incorporation—as they did partnerships during the nineteenth century—to remain as sole proprietorships well into the twentieth-century.[19] This began to change during the 1960s, however, and by the 1970s, when the profession came under attack and the nature of capital accumulation was redefined, the corporate form of practice was widely adopted by architects. By 1977, the corporate structure of practice surpassed the partnership in number, and by the 1980s, it surpassed even the number of sole proprietorships. Nearly sixty percent of architecture firms adopted corporate structures by 1982, which was a trend that was carried into the twenty-first century, with eighty percent of firms adopting such structures by 2012.[20]

There were other architecture firms, however, that located themselves between different firm structures and cultures by embracing the corporation in rhetoric but not in legal terms, including the oft-cited engine of mid-century corporate building production, Skidmore Owings &

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[18] "The Architect's Office," in *Architect's Handbook of Professional Practice* (Washington, DC: American Institute of Architects, 1971), pp. 3-6.

[19] Robert Bruegmann, *The Architects and the City: Holabird & Roche of Chicago, 1880-1918*, Chicago Architecture and Urbanism (Chicago, Ill: University of Chicago Press, 1997), p. 116. On the status of the profession by 1950, see: Turpin C. Bannister, *The Architect at Mid-Century*, vol. 1 (New York: Reinhold, 1954).

[20] In 1972, there were 1,203 incorporated architecture firms, 3,361 sole proprietorships, and 2,252 partnerships in the US. By 1977, there were 2,276 corporations, 4,409 sole proprietorships, and 1,908 partnerships. A decade later, in 1987, there were 10,571 corporations, 5,001 individual proprietorships, and 1,652 partnerships. Sources: US Department of Commerce, Bureau of the Census, *Census of Selected Services*, 1972, Subject Statistics, vol 1, table 4; and US Department of Commerce, Bureau of the Census, *Census of Service Industries, 1987,* Industry Series: Miscellaneous Subjects, table 7.

Merrill (SOM).[21] While the firm embraced the acronymic corporate brand "SOM" akin to their corporate clients, such as IBM, espoused a culture of anonymity modeled on a medieval builder's guild, and described their collaborative ideals in firm publications, SOM maintained a partnership in practice, which structurally bolstered the named individuals at the top of its hierarchical pyramid as well as the names of its individual designers.[22] "It [SOM] began as a personal thing between the two of us," Nathaniel Owings wrote about SOM's formation, "and has never developed into a corporation as most architectural firms have. It is not a product of a conglomeration or a computer."[23]

At the same time, firms such as DMJM willingly accepted new forms of practice after World War II, restructuring over the course of the twentieth-century from partnerships to corporations to variants thereafter, including corporate conglomerates, which emerged in architecture after the 1960s. While the clean, white, and homogeneous image of corporatism grew increasingly ubiquitous over the course of the twentieth-century, characterized by what historian Reinhold Martin has described as a mid-century social, technological, and aesthetic "organizational complex," many modern corporate architecture firms fought to maintain a generalist character of practice by working in large, collaborative, and egalitarian groups. However, corporate structures of practice also enabled greater variation in and between firms,

[21] Boyle, "Architectural Practice in America, 1865-1965--Ideal and Reality," p. 327.

[22] While histories of SOM productively challenge the idea of firm as an assemblage of individuals, the partnership structure implied a specific genealogy that cannot be discounted. See: Hyun-Tae Jung, *Organization and Abstraction: The Architecture of Skidmore, Owings & Merrill from 1936 to 1956,* (Ph.D. Dissertation, Columbia University, 2011). Also, on SOM's history, see: Nicholas Adams, *Skidmore, Owings & Merrill: SOM since 1936* (Milan: Electra Architecture, 2007); William E. Hartmann, "S.O.M. Organization," *Bauen Und Wohnen* 11, no. 4 (April 1957): 115–17; and Sigfried Giedion, "The Experiment of S.O.M.," *Bauen Und Wohnen* 11, no. 4 (1957), pp. 109–14.

[23] Nathaniel Owings, *The Spaces in Between: An Architect's Journey* (Wilmington, MA: Houghton Mifflin, 1973), p. vii.

permitting architects to diversify and establish relationships to professions and disciplines beyond those typically associated with architecture. Most noticeably, the idea that architecture practice was to be bounded as an organizational entity was radically called into question by joint-ventures and corporate conglomerates by the end of the 1960s. By then, concerns for profit in architecture began to outweigh concerns for organizational and material control, and many large firms were fractured into smaller parts, revealing the postwar corporation's unsuitability for the finance-driven means of late capitalist production, in which the firm, rather than the individual, was upheld as an irreducible unit of consumption and exchange. In Texas, for example, a newfound thirst for profit splintered one of the earliest incorporated and publicly traded architecture and engineering firms, Caudill Rowlett and Scott (CRS), into several commodifiable parts.[24] The firm's architecture group was sold to Missouri-based Helmuth, Obata + Kassabaum (HOK) in 1994; its Engineering and Construction groups were sold to California-based Jacobs Engineering; and its cogeneration group, CRSS Capital, was sold to the engineering firm Tractebel. In Massachusetts, the obstinate and architects-only corporation known for its postwar collaborative and "team"-based approach to practice, The Architects Collaborative, was not able to pay its expenses by the end of the 1980s and was bankrupt by 1995. As historian Bernard Boyle has explained, "the large office gradually included more and more specialists in an attempt to maintain the generalist character traditional to architecture practice, [and] paradoxically the team of workers progressively lost its original identifying characteristic of collaboration as the coordinating function was taken over by a new level of management."[25] At the core of these

[24] At the time of the split, CRS had acquired the engineering firm J.E. Sirrine and was named Caudill Rowlett Scott Sirrine (CRSS). Paolo Tombesi, "Capital Gains and Architectural Losses: The Transformative Journey of Caudill Rowlett Scott (1948-1994)," *Journal of Architectural Education* (2006), pp. 145–68.

[25] Boyle, "Architectural Practice in America, 1865-1965--Ideal and Reality," pp. 330-331.

fractures was a clash of cultural ideals: between the ideals embodied by the expansionary path of capital accumulation, predicated on changes to the structure and practice of business as described by Mary Woods, and a contradictory desire by architects to maintain a spirited control of production by guarding against the rapidly-changing economic circumstances beneath them. Yet these stories of architectural loss, obsolescence, and dissolution at the expense of capital gains have been well documented and require no further rehearsal. Instead, this research focuses on the slow historical processes, cultures, and work of those who willingly adapted to the shifting demands of capitalism after the 1960s by designing and redesigning their businesses—taking advantage of the new economic conditions to reconcile their work with professions and disciplines beyond architecture—in order to both defend themselves against economic downturns, as well as to increase their influence on urban political economies more broadly.

The goal of this dissertation is not to position DMJM and AECOM as exemplary firms of particular moments, nor is it to suggest that they represent a penultimate state or version of architecture practice.[26] Instead, it aims to examine the specific ways in which architects used the particular structure and scope of their businesses to adapt to and encourage economic change after the 1960s. DMJM's trajectory—from a profit-sapping partnership to a lucrative corporate conglomerate—parallels the history of many commercially-motivated firms, including that of Albert Kahn, founded in Detroit in 1895, or Chicago's Perkins & Will, founded in 1935—both of which similarly maintained prominent economic positions by adapting the structures of their firms. For Kahn, an interest in the evolving dynamics of capital accumulation was evidenced by

[26] Many historians of architecture firms have used AECOM as an end point in their narratives. However, this tendency reflects the traditional methods of business historians, such as Alfred D. Chandler, Jr., who overlooked the possibility for historical change, nuance, and adaptation in ways that have been described by recent business history scholarship. See: Naomi R. Lamoreaux, Daniel M. G. Raff, and Peter Temin, "Beyond Markets and Hierarchies: Toward a New Synthesis of American Business History," *The American Historical Review* 109, no. 2 (2003), pp. 404–33.

his desire to restructure his firm like DMJM: it grew from a small Detroit architecture partnership, Nettleton, Kahn and Trowbridge in 1896 to Albert Kahn, Architect with forty people by 1910 to Albert Kahn Associates with 400 people by 1929 to Albert Kahn Associates, Incorporated with 600 by World War II. [27] Still an active practice, the firm, like AECOM, was re-defined after the 1990s as a "family" of many firms "comprised of multi-disciplined areas of expertise that make up the Albert Kahn Family of Companies. These disciplines [architecture, engineering, planning, design, and management] are part of seven companies that possess the same culture and approach to excellence required to carry on the Kahn legacy and address the growing needs of our clients."[28] Perkins & Will, a partnership established by Lawrence Perkins and Philip Will, Jr., in 1935 in Chicago, restructured as a corporation that has described itself since 1986 as part of a "family of partner companies," with services ranging from retail to transportation planning to healthcare technology to hospitality design.[29] The international "family" of companies to which it now belongs, the Dar Group, was formed by the Lebanese

[27] Among others, see: Henry-Russell Hitchcock, "The Architecture of Bureaucracy and the Architecture of Genius," *Architectural Review*, no. 101 (1947), pp. 3–6; and Claire Zimmerman, "The Labor of Albert Kahn," *Aggregate* 2 (December 2014).

[28] "Albert Kahn Associates," accessed March 14, 2018, http://www.albertkahn.com/what.php. For excellent business histories that explain the shifts from twenty to twenty-first century firm structures, see: Thomas P. Hughes, "From Firm to Networked Systems," *The Business History Review* 7, no. 3 (2005), pp. 587–93; Walter W. Powell, "The Capitalist Firm in the 21st Century," in *The Twenty-First Century Firm*, ed. Paul DiMaggio (New York: Princeton University Press, 2001), pp. 33–68.

[29] "Perkins+Will Firm Profile," accessed December 12, 2017, https://perkinswill.com/firm-profile.
See also: Ronald Litke, "Perkins & Will: The First 50 Years," *Inland Architect*, October 1985, 11–15.

conglomerate Dar Al-Handasah in 1986, when it acquired Perkins & Will in order to "build a global portfolio of premium engineering and design brands."[30]

The Rise of the Corporate Conglomerate

The emergence of "families" of firms that included several diverse firms within them was described by business historian Alfred D. Chandler, Jr. in 1977. Chandler argued that a strong outgrowth from modern business enterprises surfaced during the 1960s, which he defined as the corporate "conglomerate." He noted:

> The conglomerate differed from the older, multi-industrial, multinational enterprise in its strategy (and, therefore, in the nature of its capital investments) and in its organizational structure. The large, diversified enterprise had grown primarily by internal expansion—that is, by direct investment of plant and personnel in industries related to its original line of products…The conglomerate, on the other hand, expanded entirely by the acquisition of existing enterprises, and not by direct investment into its own plant and personnel, and it often did so in totally unrelated fields.[31]

Unlike the Great Merger Movement of the late twentieth-century, during which time single-industrial organizations merged with or acquired smaller firms to form larger ones to increase their market power, corporate conglomerates signaled the advent of a new model of capitalism based on finance and speculation, and they were principally motivated by a desire to maximize

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[30] "Dar Group Factsheet," accessed January 12, 2018, http://www.dargroup.com/documents/Dar%20Group%20Factsheet%2027%20October%202016.pdf. Also see: Lawrence Bradford Perkins, Oral history of Lawrence Bradford Perkins, F.A.I.A., interview by Betty J. Blum, 2000, Department of Architecture, the Art Institute of Chicago, p. 154-55; and Eva Franch i Gilabert et al., eds., *OfficeUS: Atlas* (Zürich: Lars Müller Publishers, 2015), p. 211. For more on the connection between conglomerations and brands, see: Naomi Klein, "Mergers and Synergy: The Creation of Commercial Utopias," in her *No Logo: No Space, No Choice, No Jobs* (New York: Picador, 2010), pp. 143-164. Between 1995 and 2009, Perkins & Will initiated an aggressive acquisition campaign that coincided with that of AECOM, acquiring the firms: Nix Mann & Associates, Nix Mann Shive, The Wheeler Group, DTS Shaw Associates, Marsters & Partners, Eva Maddox Branded Environments, CRa, B2HK, Busby & Associates, Ai, MBT, Fuller & Associates, CNI, Rozeboom Miller Architects, Guenther 5, The Environments Group, SMWM, and Shore Tilbe Irwin and Partners. See: "Perkins+Will Historical Timeline," Perkins+Will, 2014, http://history.perkinswill.com.

[31] Alfred D. Chandler, Jr., *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, Mass.: Belknap Press of Harvard Univ. Press, 2002), pp. 480-81.

profits by consolidating management and capital resources across far-reaching geographies and industries.[32]

Beyond economic advantage, however, the emergence of the conglomerate marked a profound shift in the culture of architectural practice. Etymologically, the term "conglomerate" dates to the 16th century, when it implied to "ball together." More tellingly, its frequently debated Latin roots, *glem* and *glom*, are understood historically to have first implied "to embrace or latch onto" and "to ball," respectively.[33] Thus, the term conglomerate describes not only a post-1960s structure of business, but it also describes a particular culture and genealogy of practice in which practitioners readily embraced roles that transcended the historically constructed boundaries of work that defined them. At DMJM, architects eagerly re-imagined the value and potential of their work by accepting new identities and scopes of practice, through their firms, which transcended the mere designing of buildings: from architecture and engineering to technology to real estate to finance. The use of the term conglomeration by architects at DMJM therefore signified a culture of architectural practice in which architects accepted the various manifestations of architectural work in terms of value added to the firm—not by imposing a definition of what was or was *not* considered a practice of architecture, but rather by considering what was and what *could be* considered as such. Beyond architecture, this view of practice has been described by philosopher Isabelle Stengers as an "ecology of practices," in which, like a

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[32] Trailblazing industrial organizations such as DuPont and General Electric set a precedent for diversified conglomerates as early as the 1920s, when DuPont diversified its manufacturing from gun powder to paint, and General Electric from electricity to radio and television broadcasting. It was not until the 1960s that a "merger mania" of conglomerates grew to enormous proportion. See: Lamoreaux, Raff, and Temin, "Beyond Markets and Hierarchies: Toward a New Synthesis of American Business History," and Alfred D. Chandler and Bruce Mazlish, eds., *Leviathans: Multinational Corporations and the New Global History* (Cambridge, UK; New York: Cambridge, 2005).

[33] Michiel de Vaan, ed., *Etymological Dictionary of Latin* (Leiden: Brill Academic Pub, 2008).

"family," each practitioner is equally valued and sensitive to the boundaries that define their motivations, beliefs, and objectives. Within an "ecology of practices," as described by Stengers, each person is thought to actively and constructively accept the many possibilities of a practice's malleable identity—even as certain practices might contrast, diverge from, or transform historical definition.[34] Following Bruno Latour's framing of an "ecology" as an alternative view of modernization, Stengers suggests that an "ecology of practices" is a non-neutral tool that draws attention to the boundaries and overlapping identities of a practice as they are constantly negotiated, redefined, and expanded.[35]

The possibility of corporate conglomerates, including the expansion of architectural work they supported—from real estate transactions to data processing—was the result of two profound, yet interconnected shifts within the American political economy that have been characterized by the gradual transition from capitalism to late capitalism.[36] The first was a slow shift from a so-called Fordist to a post-Fordist economy between the 1940s and 1970s, during

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[34] Stengers's analysis is based on her study of the practices of physicists. See: Isabelle Stengers, "Introductory Notes on an Ecology of Practices," *Cultural Studies Review* 11, no. 1 (March 2005), pp. 183–96. For an extended and more detailed view of this framework, see: Isabelle Stengers, *Cosmopolitics I* (Minneapolis: University of Minnesota Press, 2010); Isabelle Stengers, *Cosmopolitics II* (Minneapolis: University of Minnesota Press, 2011).

[35] Anthropologist of architecture Albena Yaneva has borrowed the framework of "Ecology of Practice" as a way to understand design processes by destabilizing the historically understood opposition between subjects and objects, drawing both humans and their objects into a system of "symmetrical" feedback that, she argues, can be viewed as an "ecology." See: Albena Yaneva, "Politics of Architectural Imaging," in *Elements of Architecture: Assembling Archaeology, Atmosphere and the Performance of Building Spaces*, ed. Mikkel Bille and Tim Flohr Sørensen (London; New York: Routledge, 2016), pp. 238–55.

[36] The phrase "Late Capitalism" was used during the 1980s and 1990s to describe the shift from corporate capitalism to finance capitalism, and it described both the positive and negative impacts of the political economy. Since the 2000s, these shifts have been described as "neoliberalism," which is characterized by the same underlying political-economic shifts, but it is often associated with a darker narrative of power, greed, and crusade that DMJM's history does not embody. For an overview of this distinction, see: Sherry B. Ortner, "On Neoliberalism," *Anthropology of This Century*, no. 1 (May 2011). On the early theories of late capitalism, see: Ernest Mandel, *Late Capitalism,* (New York: Verso, 1978). For one way in which architecture and neoliberalism have been intertwined more generally, see: Douglas Spencer, *The Architecture of Neoliberalism: How Contemporary Architecture Became an Instrument of Control and Compliance* (New York: Bloomsbury Academic, 2016).

which time the relationship between labor and capital was redefined. Under Fordism, work was generally well organized, well paid, and manual labor input, such as the manual production of drawings, held a direct correlation to capital output. This relationship was slowly unhinged between the 1940s and 1970s, however, since Fordism was deemed too rigid a mode of accumulation for some. Post-Fordism allowed for labor to be set free from capital outputs and re-defined in terms of experience, knowledge, and creativity, which resulted in "more flexible" modes of capital accumulation, according to geographer David Harvey, or to an economy of "disorganized capital" according to sociologists Scott Lash and John Urry.[37] The corporate conglomerate typified the post-Fordist economy, political geographer Edward Soja argued, since production processes were fragmented in ways that sharply contrasted those with organized and highly regulated Fordist assembly lines; instead, they were characterized by subcontracting between firms, joint-ventures, mergers, acquisitions, and holding companies that helped to expand work beyond the bounds of traditional firms and ownership structures.[38]

The second major shift that undergirded the rise of conglomerates in architecture was in the role of the federal government in regulating the economy. The US Department of Justice launched an antitrust proceeding against the American Institute of Architects in 1972 and again in 1990, overturning the federal government's 1930s position that professions were exempt from antitrust laws since they were not "trades,"[39] arguing instead that their long-standing suggested

[37] David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Oxford [England]; Cambridge, Mass., USA: Blackwell, 1989), pp. 141-172; Scott Lash and John Urry, *The End of Organized Capitalism* (Madison, Wis: University of Wisconsin Press, 1987).

[38] Edward W. Soja, *Postmodern Geographies: The Reassertion of Space in Critical Social Theory* (London; New York: Verso, 1989), p. 185.

[39] This ruling was established in the case of medical practitioners, *FTC v. Raladim Co.* in 1931. See Peggy Deamer, "The Sherman Antitrust Act and the Profession of Architecture" (New York: Center for Architecture, May 2016), p. 9.

fee schedules, prohibition of discounted fees, and forbidding of competitive bidding repressed the economy and violated the terms of the US Sherman Antitrust Act, which was enacted in 1890 to limit monopolies and restraints on commerce.[40] This shift reflected the growing anxiety of a number of legal scholars and economists, such as Milton Friedman, who argued that professions especially stifled the expansion of the economy. These anxieties were reflective of a broader shift in the political-economic theories of the US government, including Ronald Reagan's 1980s theories of trickle-down economics that superseded traditional Keynesian theories, in which the government was historically expected to play a careful role in regulating, intervening in, and overseeing businesses and the economy. Instead, Keynesian economics were replaced under Reagan by post-Keynesian theories of limited government involvement, which pressured service professions, such as architecture, to promote competition and to openly welcome the pursuit of profit. Yet at the same time, the state continued to rely on large architecture and engineering firms, such as DMJM, for defense, deterrence, and urban infrastructure; therefore, the state was, in many ways, directly responsible for the prominence of large and increasingly powerful architecture firms.

Architecture Practice after 1960: A New Discourse about Profit

The shifts in the political economy during and after the 1970s presented the opportunity for architects to openly pursue profit without professional disdain, and it coincided with the advent of entirely new metrics of architectural merit. By the 1970s, the revenue and profit

[40] The 1972 proceeding was followed by another proceeding in 1990, which was a reaction to the circulation of documents by the Chicago AIA proposing limitations to competitions based on fees. The AIA was fined and was required to review its Code of Ethics. See: Wickersham, "From Disinterested Expert to Marketplace Competitor: How Anti-Monopoly Law Transformed the Ethics and Economics of American Architecture in the 1970s," p. 144-145; and Deamer, "The Sherman Antitrust Act and the Profession of Architecture."

generated by architecture firms had emerged as an alternative metric of merit by which architects could be recognized, rather than merely by the sizes of their firms or the formal and aesthetic qualities of the buildings they produced. As Peggy Deamer has argued:

> The end of corporatism in the early 70s and the emergence of neoliberalism marked the transformation in capitalism from a production/consumption model to a profit model, from productive capital to financial capital. The target is no longer a generalized, average citizen needing a modern outlook. It is consumption let loose from need. Entertainment and novelty are the paradigm and the wealthy are its audience.[41]

In 1958, *Architectural Forum* initiated an annual survey of the "biggest" architecture firms, measured first by revenue, which lasted until 1964—the same year that *Engineering News-Record* initiated a new system by which to recognize the "Top 500" design firms, which ranked and has continued to rank firms by their revenues alone. In addition, the AIA launched a study in 1967 about the means by which architecture firms readily pursued profit—or at least attempted to—in response to a self-defined problem that "very few architectural firms do any formal profit planning; 90 percent of the firms do not follow the recommended AIA accounting procedures; most architects do not understand the significance of costs and generally do not employ competent accounting skills nor maintain adequate time and costs records," proclaiming that "a major goal of any office, of course, is to make money, not lose it."[42] These new encouragements distilled and encouraged the idea that architecture could be viewed as an entirely commercial endeavor, which led to increased competition, sharper stratifications between architecture firms by the end of the twentieth-century, and the ability of larger firms, such as DMJM, to dominate

[41] Peggy Deamer, "Architectural Work: Immaterial Labor," in *Industries of Architecture*, ed. K. Lloyd Thomas, T. Amhoff, and Nick Beech (New York: Routledge, 2016), p. 141.

[42] Case and Company, Inc., *The Economics of Architectural Practice* (Washington, DC: American Institute of Architects, 1968), p. 3, 47.

construction markets—not only by procuring a larger volume of projects, but also by merging with or acquiring smaller and mid-sized firms.[43]

Moreover, these shifts were amplified by a surge in the number of architects between the 1960s and 1990s, which produced a field economically burdened by over-saturation. Between 1850 and 1960, the increase in the number of working architects in the US grew slowly and at a rate consistent with increases in general population, from 580 to 30,000, or an average increase of 267 new architects per year.[44] However, after 1960, the number of architects began to rise at a rate greater than increases in the general population, from 30,000 to 157,000 architects between 1960 and 1990, or an average increase of 4,233 new architects per year.[45] In terms of the scales of practice, by 1972 there were only fifty-four architecture firms in the United States with more than one hundred employees, accounting for only .5 percent of all firms, as compared to the 93.3 percent of firms that were comprised of fewer than twenty people.[46] However, large firms, including DMJM, grew to be disproportionately responsible for total revenue in the field, and they commanded 13.7 percent of all revenue in 1972. By 1992, the composition of firms remained nearly unchanged—with .6 percent of all firms employing over one hundred employees, and 93.2 percent with fewer than twenty—though large firms were able to take an

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[43] Robert Gutman, "Emerging Problems of Practice," *Journal of Architectural Education* 45, no. 4 (July 1992), pp. 198–202.

[44] Robert Gutman and Barbara Westergaard, *Architecture Among the Professions* (1974), p. 2.

[45] Between 1960 and 1970, the number of architects increased from 30,028 to 56,284; between 1970 and 1980 from 56,284 to 90,026; and from 90,026 in 1970 to 156,874 in 1990. For data up to1980, see: Robert Gutman, *Architectural Practice: A Critical View* (New York, N.Y: Princeton Architectural Press, 1988), p. 120. For 1990 data: US Department of Commerce, Bureau of the Census, *Census of Population, 1990*, Detailed Occupation and Other Characteristics, table 1.

[46] Firm distribution data about 1972 was obtained and analyzed from: US Department of Commerce, Bureau of the Census, *Census of Business, 1972*, Subject Statistics, vol. 1, table 4. Data about 1992 was obtained and analyzed from: US Department of Commerce, Bureau of the Census, *Economic Census, 1992,* Subject Series: Professional, Scientific, and technical Services. Establishments and Firm Size, table 5a.

increasing command—21 percent—of total revenue. This trend continued and was further exacerbated throughout the 1990s, with large firms responsible for 38.4 percent of the total revenue in the field by 1997.[47] The rise of large, multinational architecture firms therefore profoundly affected those that were smaller, since most firms remained wed to small-scale practices and were competing for an increasingly smaller share of projects.

While the definitions of professional practice as they were established during the nineteenth century were predicated on gentlemanly "disinterest" in economic theory and profit that complicated the ways in which individual practitioners could define their work in relation to free markets and private capitalist pursuits, the legal and regulatory pressures compelling the profession to align with theories of laissez-faire economics after 1970 enabled architects to become wholly unabashed in their pursuit of profit. Moreover, these shifts clarified architecture as both a service profession as well as a realm of cultural production. While the political-economic transformations in architecture were taking place, social theorist Pierre Bourdieu developed a class-based theory of practice at the end of the 1980s based upon his study of cultural practitioners, which he argued applied to artists, writers, musicians, and architects.[48]

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[47] Revenue data about 1972 was obtained and analyzed from: US Department of Commerce, Bureau of the Census, *Census of Business, 1972*, Subject Statistics, vol. 1, table 4. Data about 1992 was obtained and analyzed from: US Department of Commerce, Bureau of the Census, *Economic Census, 1992,* Subject Series: Establishments and Firm Size, table 5a. Data about 1997 was obtained and analyzed from: US Department of Commerce, Bureau of the Census, *Economic Census 1997*, Subject Series: Professional, Scientific, and Technical Services: Establishments and Firm Size, table 5a.

[48] There have been several theoretical explorations of architecture using Bourdieu's theory of cultural production, including Paul Jones, *The Sociology of Architecture: Constructing Identities* (Liverpool: Univ. Press, 2011); Garry Stevens, *The Favored Circle: The Social Foundations of Architectural Distinction* (Cambridge, Mass.; London: MIT, 2002); and Hélène Lipstadt, "Can 'Art Professions' Be Bourdieuean Fields of Cultural Production? The Case of the Architecture Competition," *Cultural Studies* 17, no. 3–4 (2003), pp. 390–419. While these are important and useful theoretical explorations, their primary focus is on Bourdieu's macro concept of the "field." Though central to his theory, the "field" is easily misconstrued in architecture as a reified entity, which runs directly counter to Bourdieu's definition, and which distracts from the study of the specific practices that operate within it. For an excellent critique and overview of these contributions, see: Magali Sarfatti Larson, "Practice and Education in 21st Century Architecture: A Sociologist's View," in *Dilemas Do Ensino de Arquiteture No Seculo*, ed. F Lara and S Marques, 21 (Austin, TX: nhamericapress, 2015).

Bourdieu argued that each practitioner lived and worked within an economic and class-based "field" of positionality—vying for recognition and prestige by accumulating various forms of capital, such as "economic" capital, "cultural" capital (materials, tastes, education, or skills that elevate one's status), and "social" capital (access to certain groups, people, and institutions). Central to Bourdieu's theory was a fundamental opposition between art and commerce—a characterization that, prior to the 1970s, persisted in architecture merely at the level of truism or professional contradiction. Instead, Bourdieu argued that practitioners, when viewed as a part of a collective, could be defined by their level of individual interest in capitalist economics, rather than by scale alone. On one side of his binary were those who aimed to detach themselves from economic theory and markets in an effort to establish an autonomous "anti-economy" characterized by an ability to claim a "disinterest" in economics. Rather than conform to the beliefs imposed on them by institutions or structures such as a profession, they could, according to Weberian thought, prove their "authenticity" by the fact that they earned little income—let alone profit.[49] On the other side of the binary were practitioners who held an explicit *interest* in economic theory, who desired to learn about and engage with economic markets and, most importantly, who specifically aimed to maximize profits. DMJM represents a particularly illuminating example of architects who became deeply attuned and sensitive to shifts in economic markets and the dominant means of capital accumulation. The ideas at DMJM about architectural practice were first and foremost motivated by a brazen interest in the maximizing of profit, and the founding partners' ideas about business were published in as many issues of

[49] Bourdieu, *The Field of Cultural Production*, p. 40.

Business Week, *Fortune,* and *Management Methods* as their projects were in *Architectural Record* or *Progressive Architecture*.[50]

Against this backdrop, however, positions of "disinterest" persisted in architecture, which Bourdieu would have argued were inevitable and testaments to the strength of architecture as a field of cultural production, as evidenced by well-known claims of independence, autonomy, or resistance: in 1953, Robert Venturi left the firm Eero Saarinen and Associates in Michigan because he "did not feel totally at home" in an increasingly bureaucratic setting; in 1959, Peter Eisenman left the architecture corporation The Architects Collaborative after being "disillusioned" by corporate practice;[51] in 1961, Frank Gehry left Victor Gruen Associates because "the place was becoming corporate…[and] more business-oriented;"[52] and in the early 1970s, nearly a dozen architects left the corporate firm Caudill, Rowlett, Scott in Houston after it was publicly listed on the stock market.[53] However, despite these moves toward independence in

[50] Despite this conclusion, the founding partners routinely differentiated between the practices of "business" and that of the architectural "profession," though they did not discriminate between the two in terms of importance. In the 1960s, for instance, Phillip Daniel argued: "we feel that we are perhaps 70 per cent professional, but we are at least 30 per cent on the side of business and commerce. Whether the percentages are correct or not is immaterial. The conclusion is important, though, because we have found that we must be concerned with handling our relationships with our clients/customers in a businesslike manner." "Office Organization and Procedures for Present-Day Practice," *Architectural Record*, (June 1960).

[51] Peter D. Eisenman, "The Formal Basis of Modern Architecture [1963]" (Lars Müller, 2006). p. 378.

[52] Frank Gehry in: Barbara Isenberg, *Conversations with Frank Gehry*, 1st ed (New York: Alfred A. Knopf, 2009), p. 47.

[53] For architecture, Dana Cuff has argued that "This basic drama pits a starving artist against a profit-driven barbarian. Needless to say, few practitioners find these distinctions useful, even though they may structure their own complaints along equally clichéd lines." Dana Cuff, "The Political Paradoxes of Practice: Political Economy of Local and Global Architecture," *Architecture Research Quarterly* 3 (1999), pp. 79–80. In contrast, sociologist Robert Gutman maintained that such a tension between "art" and "commerce" has historically divided practitioners, and that "it always will, and…it always should, because it is central to architecture's existential condition." Gutman, "Emerging Problems of Practice," p. 198. Others, such as Peggy Deamer, have argued that the distinctions have maintained, though the distance between the two has decreased. Peggy Deamer, "Design and Contemporary Practice," in *Architecture from the Outside In: Selected Essays by Robert Gutman*, ed. Dana Cuff and John Wriedt (New York: Princeton Architectural Press, 2010), pp. 81–85. 6/1/18 4:49:00 PM

purported claims of disinterest, the degrees to which such architects maintained or carried commercial values with them to their ostensibly independent practices remains to be examined by historians.

While the explicit *interest* in economic markets and profit, as evidenced by the rise of the corporate conglomerate, heightened divisions between large and small firms, increased competition, and illuminated structural inequalities, this research aims neither to glorify nor embolden such practices, but instead to examine how the architects within them, such as those at DMJM, established a new order of architecture practice under late capitalism by expanding the role of the architect and by re-defining the value of their work in relationship to the urban economies in which they were embedded. By diversifying the services offered by their firm, architects at DMJM reconsidered their place within the political economy by defining architectural labor in terms of economic value rather than cultural contribution, and they began to view themselves as workers with value akin to a much broader range of urban practitioners—as a "family"—that included engineers, urban planners, and economists—rather than as autonomous, independent, creative, or genius. As a result, DMJM emerged as an agile architecture firm whose palette of expertise, conglomerate structure, and managerial capacity served to expand and make fluid what was historically construed as architectural work.[54]

Studying Architecture as a Practice

DMJM is often overlooked in architectural scholarship, primarily due to the firm's portfolio of infrastructural, military, and institutional projects, such as wastewater treatment

[54] The result of this expansionary trajectory has been described as an "urban desire" of large architectural practices. Dana Cuff, "Architecture's Undisciplined Urban Desire," *Architectural Theory Review* 19, no. 1 (2014), pp. 92–97.

plants, transportation systems, and ballistic missile facilities that have been historically relegated to the margins of architecture. DMJM's chief contributions to architecture have been described through the work of its individual designers rather than through the firm's collective practices. These contributions include the work of architects Cesar Pelli and Anthony Lumsden—both of whom were hired in 1964 from the office of Roche and Dinkeloo (after Eero Saarinen and Associates) as Director of Design and Assistant, respectively, and emerged as central figures in architecture discourse in Los Angeles and internationally.[55] Yet an increasingly large body of architectural scholarship has, especially over the past two decades, challenged and demystified the image of the architect as a single male elite working alone in his studio. Equally committed to critiquing these positions, both architectural historians and ethnographers alike have turned to study the collective design processes of architects, their firm structures, and the cultures of their practice, though the narratives they produce—historiographical on the one hand and ethnographic on the other—suggest a dichotomy in the definition of, and in the methods for studying, architecture as a practice, which this research aims to transcend.

There are two primary bodies of literature about architecture practice that undergird this study. The first consists of histories that describe the discursive, organizational, and aesthetic conditions of the postwar period that rendered corporate ideologies in architecture visible, including Reinhold Martin's *The Organizational Complex: Architecture, Media, and Corporate Space*, in which he argues that a tendency toward organization permeated architectural discourse

[55] See, among others: "Profile: Daniel, Mann, Johnson and Mendenhall: A Summation of Parts," *Progressive Architecture*, (June 1972), pp. 72–83; John Pastier, "Architecture for Big Business Has Become Big Business," *Los Angeles Times*, April 6, 1972; "The Silvers: Anthony J. Lumsden," *Progressive Architecture*, (October 1976), pp. 70–74; Todd Gannon and Ewan Branda, eds., *A Confederacy of Heretics* (Los Angeles, CA: SCI-Arc Press and Getty Publications, 2013); "Lumsden, A. J., Architect," in *Silver Architecture* (Los Angeles, CA: UCLA School of Architecture, 1974); and "Recent Works of Anthony J. Lumsden, DMJM," *Space Design*, no. 9311 (November 1993), pp. 4–44.

and united information, business, and technology through an extension of the military-industrial complex.[56] Martin's work provides both an important methodological and historical foundation for any study of corporate architecture, and it is against the backdrop of mid-twentieth-century corporatism that subsequent variations, such as corporate conglomerates, can be made clear. Secondly, Peggy Deamer's research on the history of capitalism and labor as it relates to architects and architectural practices has described the ways in which design has—or in some cases has not—been historically viewed as a form of work. Deamer's research demonstrates how the shifts in capitalism, including from corporate to finance capitalism in the US, precipitated the architectural conditions upon which this research is based.[57] This research into DMJM's history attempts to describe how architecture firms were not only conditioned by shifts in capitalism, but also how they instigated and reinforced them. Equally important to this research is John Harwood's *The Interface*, which broadens the lens of architectural design to examine the role of architects in the designing of corporations. Harwood reveals how the efficiencies and prominence of corporations, such as IBM, relied not only on business expertise to establish protocols and procedures of business, but also on designers who produced the equally imperative images and identities of corporations themselves.[58] As Harwood describes, the term "design" in architecture was historically associated with material composition and the planning for construction through drawing. However, for him, its derivation from the Latin word *designare*,

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[56] Reinhold Martin, *The Organizational Complex: Architecture, Media, and Corporate Space* (Cambridge, MA: MIT Press, 2003).

[57] See, among others: Peggy Deamer, ed, *Architecture and Capitalism: 1845 to the Present,* (New York: Routledge, 2013); Peggy Deamer, "Work," *Perspecta 47: Money* (2014), pp. 27–39; and Peggy Deamer, "Architectural Work: Immaterial Labor," in *Industries of Architecture*, ed. K. Lloyd Thomas, T. Amhoff, and Nick Beech (New York: Routledge, 2016).

[58] John Harwood, *The Interface: IBM and the Transformation of Corporate Design, 1945-1976* (Minneapolis, MN: University of Minnesota Press, 2011).

meaning to "mark out," implied a much broader means by which architects could establish order, including not only of the material environment, but also the social, technological, political, and economic environments as well.[59] Thus, to consider the practices of architects necessarily means to consider their firms—since they vary significantly from one to the next—as one might consider a building, since they are both results of social, cultural, and economic processes and establish one's relationships to a political economy.

Additionally, an increasingly rich body of important, though largely unpublished, historical monographs about architecture and corporations has greatly shaped this research.[60] Those most closely related to the specific practices of architects include Hyun-Tae Jung's *Organization and Abstraction: The Architecture of Skidmore, Owings & Merrill from 1936 to 1956,* which offers a history of SOM that describes the large-scale architecture firm as an organization rather than as an assemblage of named and authorial individuals.[61] As well, Michael Kubo's *Architecture Incorporated: Authorship, Anonymity, and Collaboration in Postwar Modernism* is one of the few studies that examines how architecture firms came to be viewed *as* corporations.[62] Kubo reveals how corporate ideas were predicated on a rejection of individualism that produced in a culture of collaboration, anonymity, and "team"-based approaches to architecture practice that coincided with postwar modernism in the US—ideals that, he argues,

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[59] John Harwood, *The Redesign of Design: Multinational Corporations, Computers and Design Logic, 1945-1976* (Ph.D. Dissertation, Columbia University, 2006), p. 14.

[60] For dissertations about corporations and architecture, see: Alexandra Lange, *Tower Typewriter and Trademark: Architects, Designers and the Corporate Utopia, 1956-1964*, (Ph.D. Dissertation, New York University, 2005); and Grace Ong Yang, *Architecture, Advertising, and Corporations, 1929-1959* (Ph.D. Dissertation, University of Pennsylvania, 2010).

[61] Jung, *Organization and Abstraction: The Architecture of Skidmore, Owings & Merrill from 1936 to 1956.*

[62] Kubo, *Architecture Incorporated: Authorship, Anonymity, and Collaboration in Postwar Modernism.*

were most vividly practiced by The Architects Collaborative (TAC). Kubo defines "corporations" as social and institutional forms, following the work of John Harwood and Reinhold Martin, which allows the term to apply to most large-scale, collaborative firms, including those born as early as the nineteenth century.[63] However, as this research will demonstrate, there were many variations across and between corporations, including many that legally maintained partnerships or sole proprietorship even despite a rhetorical embrace of "collaboration" and "corporatism," while others began to adopt conglomerate forms of corporate practice after the 1960s. Lastly, Zachary Tate Porter's *Shifting Grounds of Architectural Practice* examines how the ground itself became a means by which professionals during the late nineteenth and early twentieth centuries negotiated their increasingly rigid disciplinary boundaries, including engineering, architecture, landscape, and urban planning.[64] As the history of DMJM will reveal, the emergence of speculative finance capital by the 1970s expanded the view of architecture business, while at the same time it facilitated negotiations of land speculation and real estate that were inherently linked to the ground.

While these histories of architecture provide intricate views into the formations of postwar architecture firms and corporate architecture, they remain disconnected from ethnographic scholarship that has considered how negotiations, discourse, routines, beliefs, and actions of architects unfold or unfolded in practice. This tendency reflects architecture's disciplinary formation, according to Beatriz Colomina, who has argued that historians and critics have, at least until the end of the 1990s, found greater reassurance and confidence in objects,

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[63] On Harwood's analysis of the multiple and complex definitions of corporations, in which he ends by describing Ronald Coase's 1937 theories of a "firm" as a theory of a "corporation," see: John Harwood, "Corporate Abstraction," *Perspecta* 46 (2013), pp. 218-243

[64] Zachary T. Porter, *Shifting Grounds of Architecture Practice: Boundary Conditions and Field Formations in the US Design Professions* (Ph.D. Dissertation, George Institute of Technology, 2017).

aesthetics, and built form than in the messiness of practice, due in part to architecture history's art historical foundations.[65] Against this backdrop, ethnographers beginning in the 1980s have drawn on the methods and theories of cultural anthropology, including Dana Cuff's foundational ethnography, *Architecture: The Story of Practice*, which described how building projects within architecture firms were the centerpieces of complex social negotiations between architects, their clients, and consultants.[66] Beyond Cuff, sociologist Robert Gutman during the 1980s revealed how the work of architects was distributed along increasingly stratified lines, and he folded labor demographics into his analyses of architectural practice in order to understand the historical values assigned to practitioners and their consequences for the field as a whole.[67] Additionally, Judith Blau examined the structure of architecture firms in detail during the 1970s, tracing the ways in which organizational form correlated to design recognition and economic stability during economic recessions. Blau's study has especially informed this research about the inner-workings architecture firms, since it described the very moment when multinational corporate conglomerates began to form in architecture.[68]

Over the past two decades, ethnographers have turned back to the inner-workings of architecture practice by building on the sociological and anthropological footings provided by Cuff, Gutman, and Blau in the 1980s. More recently, ethnographers of architecture, including Albena Yaneva, have turned to science and technology studies and the Actor-Network Theory

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[65] Beatriz Colomina, "Collaborations: The Private Life of Modern Architecture," *Journal of the Society of Architectural Historians* 58, no. 3 (1999), p. 468.

[66] Dana Cuff, *Architecture: The Story of Practice* (Cambridge, Mass: MIT Press, 1992).

[67] Robert Gutman, *Architectural Practice: A Critical View* (New York, N.Y: Princeton Architectural Press, 1988).

[68] Judith R. Blau, *Architects and Firms: A Sociological Perspective on Architectural Practice* (Cambridge, Mass.: MIT Press, 1984).

(ANT), as described by Bruno Latour and Michel Callon, in order to describe how architecture could be viewed not only as a series of social negotiations, as described by Cuff, but instead as social *and* material negotiations, by considering non-human subjects as actors with agency—from building models to documents to drawings.[69] Taken as a whole, ethnographers of architecture practice have assiduously acknowledged the historicity of the subjects they study, following Bruno Latour's recognition that some elements of society originate from "other" times and locations that are entwined with the present, or Michel Callon's acknowledgment that systems such as market economies are historical processes.[70] However, they unequivocally distance themselves from historiography and historical objects, and in so doing, they attempt to maintain an operative dichotomy between history and ethnography, suggesting that they are able to afford a more intricate view of emerging local dynamics and that the construction of historical knowledge should be left to "professional" historians.[71]

While this distancing can perhaps be understood as a result of history's disciplinary formation in the early nineteenth century, which garnered strength by disassociating itself with presentist rhetoric and so-called "realism," theories of "practice" as they were first defined

[69] Albena Yaneva, *Made by the Office for Metropolitan Architecture: An Ethnography of Design* (Rotterdam: 010 Publishers, 2009); Albena Yaneva, *The Making of a Building: A Pragmatist Approach to Architecture* (Oxford [England]; New York: Peter Lang, 2009). For Latour's methodological foundation, upon which Yaneva's work is based, see: Bruno Latour and Steve Woolgar, *Laboratory Life: The Construction of Scientific Facts [1979]* (Princeton, N.J: Princeton University Press, 1986); and Bruno Latour, *Science in Action: How to Follow Scientists and Engineers through Society* (Cambridge, Mass: Harvard Univ. Press, 1987).

[70] For Latour, see: Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford: Oxford Univ. Press, 2005); Bruno Latour, *Pandora's Hope: Essays on the Reality of Science Studies* (Cambridge, Mass: Harvard University Press, 1999). For Callon, see: Michel Callon, "Actor-Network Theory—The Market Test," in *Actor Network Theory and After*, ed. J Law and J Hassard (Oxford: Blackwell Publishing, 1999), pp. 181–95.

[71] Latour and Woolgar, *Laboratory Life*, p. 107.

during the 1970s and 1980s were explicit in their relationship to history.[72] As a theoretical tool with which one could understand the actions, discourse, and beliefs of people in relationship to the broader structures and forces that surrounded and influenced them, practice theory emerged during the 1970s within cultural anthropology, and sociologists and anthropologists began to fold history into their work by describing practices as either productions or reproductions of history.[73] These studies were decidedly *not* about architecture, professions, or even art practices, and they ranged from Eric Wolf's political-economic history, *Europe and the People Without History*,[74] to Clifford Geertz's cultural history, *Negara*,[75] to Bernard Cohn's colonial histories.[76] As anthropologist Sherry Ortner has argued, these turns to history were important to the formation of practice theory as such, precisely because they

> destabilized traditionally static modes of ethnographic inquiry, and substantively, in insisting that the traditional world of anthropological objects—'cultures'—were not timeless and pristine objects, but were themselves products of the restless operation of

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[72] For an overview of this history and its relationship to architecture, see: Aaron Cayer, "From Archive to Office: The Role of History in Theories of Architecture Practice," in Albena Yaneva (ed), *Ardeth: BOTTEGA: Ecology of Design Practice*, no. 2 (March 2018).

[73] The new term, "practice," was described and theorized by sociologists Pierre Bourdieu, Anthony Giddens, and anthropologist Marshall Sahlins, and it was used to describe practitioners and their actions "on the ground," as well as the "structures" that both constrained and could be altered by them. See: Pierre Bourdieu, *Outline of a Theory of Practice*, trans. Richard Nice (Cambridge: Cambridge Univ. Press, 1977); Anthony Giddens, *Central Problems in Social Theory: Action, Structure, and Contradiction in Social Analysis* (Berkeley: University of California Press., 1979); Marshall David Sahlins, *Historical Metaphors and Mythical Realities: Structure in the Early History of the Sandwich Islands Kingdom*, (Ann Arbor: University of Michigan Press, 1981).

[74] Eric R. Wolf, *Europe and the People without History* (Berkeley: University of California Press, 1982).

[75] Clifford Geertz, *Negara: The Theatre State in Nineteenth-Century Bali* (Princeton, N.J: Princeton University Press, 1980).

[76] Bernard S. Cohn, "History and Anthropology: The State of Play," *Comparative Studies in Society and History* 22, no. 2 (April 1980), pp. 198–221; Bernard S. Cohn, *Colonialism and Its Forms of Knowledge: The British in India* (Princeton, N.J: Princeton University Press, 1996).

both internal dynamics (mostly local power relations) and external forces (such as capitalism and colonialism) over time.[77]

More assertively, in her own study of the founding of Buddhist temples and monasteries among the Sherpas of Nepal, Ortner argued that "a theory of practice is a theory of history."[78] In this view, the study of architecture as a practice would mean to study the social negotiations between architects, clients, builders, models, contracts, documents, and drawings, but also the broader structures, such as the institutions, regulatory structures, laws, codes, and capitalist systems that explain how a practice came to be, describe who and how one may be privileged to act or speak, and whether or not actions and discourse demonstrate historical continuity or transformation.[79]

Methods of the Dissertation: Historical Ethnography

In an effort to maintain a sensitivity to both the historical shifts taking place within DMJM that describe the particular rise of the corporate conglomerate in architecture, as well as

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[77] Sherry B. Ortner, *Anthropology and Social Theory: Culture, Power, and the Acting Subject* (Durham: Duke University Press, 2006), p. 9. In studies of architecture, ethnographic frames have not always been viewed as inherently static, even when substantively informed by history as well as science and technology studies, as evidenced by several recent studies of infrastructure. See: Keller Easterling, *Extrastatecraft: The Power of Infrastructure Space* (London; New York: Verso, 2014); Brian Larkin, "The Politics and the Poetics of Infrastructure," *Annual Review of Anthropology* 42 (2013): 327–43; Max Hirsh, *Airport Urbanism: Infrastructure and Mobility in Asia* (Minneapolis, MN: University of Minnesota Press, 2016); Filip De Boeck and Marie-Francoise Plissart, *Kinshasa: Tales of the Invisible City* (Leuven: Leuven University Press, 2006).

[78] Sherry B. Ortner, *High Religion: A Cultural and Political History of Sherpa Buddhism*, Princeton Studies in Culture/Power/History (Princeton, N.J: Princeton University Press, 1989), p. 199.

[79] Bourdieu's influential concept of a "habitus" was one of the few points of agreement between Bourdieu's theory of practice and Latour's, and thus it serves as a site of common ground between cultural anthropology and science and technology studies and, by extension, between histories and ethnographies of architecture practice. In his own interpretation, Latour (2005) described the habitus as "circuitry through which plug-ins lend actors the supplementary tools—the supplementary souls—that are necessary to render a situation interpretable," p. 209. Following Bourdieu, Latour asks: "Doesn't reading novels help you know how to love?...Without the avid reading of countless fashion magazines, would you know how to bake a cake?" The sources of contention for Latour, however, are what he refers to as the broader "dark" social forces (structures) not directly connected to the body politic nor easily reducible to a tangible object to study within an ethnographic present: "If you remember that there is nothing beyond and beneath, that there is no near-world of the social, then is it not fair to say that they make up a part of your own cherished intimacy?" p. 209.

the discourses and negotiations as they unfolded in practice, this research borrows from the methods of both historical analysis and ethnography through "historical ethnography." Anthropologists such as George Marcus and James Clifford have, not without challenge, encouraged ethnographers since the 1980s to position themselves within processes of writing history, while at the same time, historians, including Hayden White, have understood the concept of writing history akin to the writing of ethnographic narratives.[80] For White, the interlacing of history and ethnography served as a foundation of a "theatre of 'practical reason'…in which human agency [is] displayed in the activity of making a world rather than simply inhabiting one."[81] This method defines practices as embodiments of history, which political philosopher Michael Oakeshott described as the form of the past—the "practical past"—that shapes a person's everyday tasks, actions, and decisions, or what sociologist Pierre Bourdieu described as a person's "habitus," which he argued was the set of societal forces written into one's body: the system of acquired dispositions functioning as "categories of perception and assessment," "classificatory principles," and the "organizing principles of action."[82] Methodologically, historical ethnography has been most thoroughly theorized by anthropologists Jean Comaroff and John Comaroff and expanded upon by a number of recent scholars.[83] While the Comaroffs

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[80] See: James Clifford and George E. Marcus (eds.), *Writing Culture: The Poetics and Politics of Ethnography,* (Berkeley: University of California Press, 1986); Hayden White, *The Content of the Form: Narrative Discourse and Historical Representation,* (Baltimore: The Johns Hopkins University Press, 1987); and *Metahistory: The Historical Imagination in Nineteenth-century Europe,* (Baltimore: The Johns Hopkins University Press, 1973).

[81] Hayden White, "A Practical Past," *Historein*, no. 10 (2010), p. 14.

[82] Pierre Bourdieu, *In Other Words: Essays towards a Reflexive Sociology* (Stanford, Calif: Stanford University Press, 1990), p. 13. On the "Practical Past," see: Michael Oakeshott, *On History and Other Essays* (Indianapolis: Liberty Fund, 1999).

[83] See, for example: Mary Des Chene, "Locating the Past," in *Anthropological Locations: Boundaries and Grounds of a Field Science*, ed. A Gupta and A Ferguson (Berkeley and Los Angeles: University of California Press, 1997), 68–85, and Ann Laura Stoler, "Colonial Archives and the Arts of Governance," *Archival Science* 2 (2002), pp. 87–109.

suggest that the study of history may indeed rattle the age-old epistemological credo of ethnography that “seeing is believing,” they offer a reminder that ethnography is

> not a vain attempt at literal translation, in which we take over the mantle of an-other’s being, conceived of as somehow commensurate with our own. It is a historically situated mode of understanding historically situated contexts, each with its own, perhaps radically different, kinds of subjects and subjectivities, objects and objectives.[84]

Following Claude Levi-Strauss’s assertion that ethnographers and historians are united in an effort to represent societies other than those in which they live, whether removed in time or in space, they argue that both ethnography and historical analysis constitute specific epistemologies but are united in their ability to extend beyond the immediate site of a practice as it unfolds in the present or as it may have unfolded in the past.[85] The Comaroffs argue:

> Ethnography surely extends beyond the range of the empirical eye; its inquisitive spirit calls upon us to ground subjective, culturally configured action in society and history—and vice versa—wherever the task may take us…In this sense, one can ‘do’ ethnography in the archives…one can also ‘do’ the anthropology of national or international forces and formations: of colonialism, evangelism, liberation struggles, social movements, dispersed diasporas, regional ‘development,’ and the like.[86]

In other words, while the epistemological underpinnings of ethnography as a way of seeing may be limited, or in some ways undermined by historical analysis, historical ethnography is a method of research applicable to both historians and ethnographers of architecture alike. Among the sites that ethnographers of architecture now visit when they go to “the field” is the archive—the very site where Foucault suggested the “rules of practice” were established—to reveal the

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[84] John L. Comaroff and Jean Comaroff, *Ethnography and the Historical Imagination*, Studies in the Ethnographic Imagination (Boulder: Westview Press, 1992), p. 10.

[85] Claude Lévi-Strauss, *Structural Anthropology* (New York: Basic Books, 1963).

[86] Comaroff and Comaroff, *Ethnography and the Historical Imagination*, p. 11.

interrelationships between people and material objects, as well as the structures of power—from states to institutions—that may be imposed upon them.[87]

Therefore, an important first step in studying the history of an architecture firm such as DMJM—a firm that held a multinational presence and long record of highly classified governmental and institutional partnerships—would be to define and examine the composition and protocols of the firm's archive. While AECOM maintains an off-site "vault" of its documents and drawings, in which DMJM's historical collections are stored, the vault is restricted from public access. Though this poses an immediate and seemingly insurmountable challenge to any research about the firm's history and its practices, the particular control of the firm's records reveals a complex entanglement of power structures—of states, institutions, and corporate clients—that came to characterize many large architecture firms by the end of the twentieth century. For instance, at the beginning of this research, requests for access to AECOM's archives and DMJM's historical records were met with enthusiasm and interest by the firm's CEO and its President; however, after fourteen months of meetings and negotiations with the firm's legal counsel, archival access was denied. The attorneys argued that public research access—even if only for studying the firm's history—could ostensibly expose the firm as well as its former clients, including the US government and the City of Los Angeles, to liability. The counsel suggested that the rights of access to the firm's drawings and documents were determined not by AECOM but by the clients that funded them, suggesting that the funding of a project, or the government's classificatory systems imposed upon them, trumped the rights of an architect and engineer to their own work. Beyond client-funded projects, however, this blanket of restriction was draped over the firm's entire collection, as requests to access even the most

[87] Michel Foucault, "The Statement and the Archive," in *The Archaeology of Knowledge and the Discourse on Language* (New York, N.Y: Pantheon Books, 1972), pp. 79–126.

mundane of DMJM's business documents, from organizational diagrams to contracts, were also denied, though the firm provided a concise, self-written history of DMJM.

This dissertation is therefore necessarily multi-method in approach. In lieu of an openly accessible archive—the kind that one may hope to rely on for a historical study of an architecture firm—this research began by following the various paper trails outside of the firm's own archive, including the fragments of documents and drawings held by former employees in the attics, closets, or garages of their homes, as well as at institutions across the US, which varied widely in their restrictions and constraints. The archives ranged from the Huntington Library and Art Collections in California, where a small sample of business documents and company brochures associated with specific individuals were housed and made publicly available, as well as the Los Angeles Bureau of Engineering, Cal State Universities at Northridge and Dominguez Hills, and Yale University, where particular project files and drawings were stored. There were other archives, however, that were far more restrictive in nature, such as the national Security Exchange Commission, where the company's legal registrations and tax documents were filed, as well as the Air Force Historical Research Agency and the Central Intelligence Agency (CIA), where drawings, memos, and documents associated with the firm's classified government projects, including military bases and nuclear missile facilities, were located. This latter group—federal agencies with highest degrees of security and government classifications—required the submission of over twenty-five Freedom of Information Act requests. Each agency required formal, written requests that described in detail the particular document of interest, its corresponding project, as well as its exact date of construction—to be determined without a finding aid or any knowledge if such a file exist—and at least one year for the government to research, declassify, redact, and then distribute. Thus, this process of archival research, which significantly limits one's ability to systematically comb through a rousing overabundance of archival documents, presents the possibility for historical gaps about the detailed inner-workings and culture of the firm itself. However, these gaps can be importantly reconciled through ethnographic means. Therefore, beyond historical documents, which can themselves be understood as records of social, material, and institutional negotiations, nearly thirty oral histories, reflections, and interviews of former architects, business leaders, draftspersons, and family members helped to provide insight into DMJM's history by highlighting and drawing attention to particular discursive formations and power dynamics as they may have unfolded in the past.

Structure of the Dissertation

In three topical chapters, this dissertation examines the ways in which architects at DMJM established an enduring firm capable of withstanding the boom and bust cycles of the US economy during the second half of the twentieth-century. By adopting a constructivist view of architecture practice that embraced and was attuned to economic markets and economic theory, architects were able to position themselves as social and economic equals, rather than as superiors, to a broader range of urban practitioners. The chapters examine the different means by which architects accumulated and reconciled forms of capitalist power: by accumulating economic capital, or profit, through the particular structure of their firm (Chapter Two); by establishing social and global influence by forming deep relationships with the government, as well as with institutions and industries in positions of power (Chapter Three); and by recognizing the role of disciplinary influence by hiring architects interested in and capable of defining the economic logics of business in terms of material and aesthetic form (Chapter Four). Chapter

Two, “A Firm of Firms: The Rise of Conglomerate Architecture Practices,” examines the historical formation of DMJM as a firm, as well as the ways in which corporate conglomeration emerged after the 1960s as both a new structure and culture of practice associated with growth, profit, and urban economics. It traces the ways in which the dismantling of Fordist economics gave rise to architecture firms that departed from mid-century corporate ideals, based on organization and material control, in order to adopt corporate ideals that were outward-focused and flexible. This manifested in firms that were comprised of multiple firms, associations, joint-ventures, mergers, acquisitions, and sub-contracts. The chapter reveals how corporate conglomeration not only resulted in an expanded view of architecture practice that typified post-Fordism and late capitalism in general, but also how, at the same time, the shape of architecture practice began to take on that of an entire urban economy. Chapter Three, “Defend and Deter: Architecture and the Military-Industrial-Entertainment Complex,” examines the social foundations of DMJM and the specific ways in which the founding architects’ views of practice were conditioned by the dominant institutions and industries in Southern California, including Hollywood, the aerospace industry, and the University of Southern California. These relationships led to projects that were unprecedented in scale and geographical span, including large military bases and ballistic missile facilities during the Cold War that required experiences, expertise, and skills that no single architecture firm held at the time. This chapter reveals how the imperial aspirations of the US military were predicated on new forms of multi-firm and multidisciplinary collaborations in architecture, which ultimately led to corporate conglomeration. DMJM’s specific involvement in military projects during the Cold War, including the designing of testing and training facilities for the nation’s first fully hardened, operational Intercontinental Ballistic Missiles facilities, revealed how corporate conglomerate structures could be viewed as a means by which architects could simultaneously brace against unexpected downturns in the economy, as well as impress their expanded capacity upon the world through military order and discipline. Lastly, Chapter Four, “Indeterminacy: The Architecture of Conglomerates,” focuses on the ways in which the discourse of conglomeration influenced the theories of formal composition in architecture. Not only was the term used to describe the structures of businesses during the 1960s and 1970s, but it also came to describe the physical and aesthetic conditions that enclosed such enterprises, including the laboratories and office spaces in which many were based. This chapter examines the theories of design developed by architects at DMJM, such as those by Anthony Lumsden and Cesar Pelli, which were direct responses to the demands for efficiency, flexibility, and profitability by DMJM’s corporate conglomerate clients, such as the microelectronics company Teledyne Systems. While many of the buildings produced by Pelli and Lumsden came to be characterized by their reflective, increasingly thin, and hermetic surfaces that scholars have upheld as products of late capitalism, this chapter reveals how it was through the particularities of conglomerate business, including the unpredictable and indeterminable rate and direction of acquisitions and mergers, that the speculative affinities of late capitalism, and ultimately the concepts of postmodernism, were made visible.

CHAPTER 2

A Firm of Firms: The Rise of Conglomerate Architecture Practices

In his l977 study of American businesses, *The Visible Hand,* historian Alfred D. Chandler, Jr. argued that the rise of large, increasingly diversified, multinational, and managerial organizations typified twentieth-century forms of modern business enterprise and drove the US economy. According to Chandler, the visible hand of management after World War II superseded the pre-war dependency of smaller, single-service firms on the invisible hand of markets.[1] One particular outgrowth of the diversified modern enterprises, he argued, was the conglomerate—a type of industrial organization that proliferated during the 1960s and 1970s and grew by acquiring and merging with existing firms that were commonly unrelated in industry, market, or geography.[2] For architecture, urban sociologist Robert Gutman argued that the increasing prevalence of large architecture firms by the 1970s accelerated the transformation of architectural practice into an industrial form of organization, though he offered an expressive note of caution: "the issue that inevitably arises in any revelation of the dominance of architectural practice by the large firm is how far it will go, and will it swallow the offices made up of two or three partners and a professional staff of a couple of other architects working full- or

[1] Alfred D. Chandler, Jr., *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, Mass.: Belknap Press of Harvard Univ. Press, 2002), pp. 480-482. Also see: Neil Fligstein, "The Spread of the Multi-Divisional Form Among Large Firms, 1919-1979," *American Sociological Review* 50 (1985), pp. 377–91.

[2] Trailblazing industrial organizations such as DuPont and General Electric set a precedent for diversified conglomerates as early as the 1920s, when DuPont diversified its manufacturing from gun powder to paint, and General Electric from electricity to radio and television broadcasting. It was not until the 1960s that a "merger mania" of conglomerates grew to enormous proportion. See: Chandler and Mazlish.; Editors of Fortune, *The Conglomerate Commotion* (New York: The Viking Press, 1970); Neil Fligstein, "The Structural Transformation of American Industry: An Institutional Account of the Causes of Diversification in the Largest Firms, 1919-1979," in *The New Institutionalism in Organizational Analysis*, ed. Walter W. Powell and Paul DiMaggio (Chicago: University of Chicago Press, 1991), pp. 311–36; and Lamoreaux, Raff, and Temin, "Beyond Markets and Hierarchies: Toward a New Synthesis of American Business History," p. 422.

part-time."[3] Yet such practices were taking place during the 1970s directly beneath Gutman's own observant eyes. In a 1971 article in *Fortune*, editor Gurney Breckenfeld presented a bleak view of architecture as a profession pushed to the sidelines of discourse about urban growth and on the brink of "obsolescence," which he argued was only able to be revived by entrepreneurial architects willing to shatter "professional tradition."[4] Transcending "tradition," for Breckenfeld, meant to abandon sole proprietorships or partnerships and instead to embrace new forms of architecture practice that would allow architects to expand the role and value of architectural work necessary to confront and engage with the disparate challenges associated with urbanization. As examples of these new forms of practice, Breckenfeld pointed to architects who were collaborating by joining their firms together, combining their services, and crossing geographies through acquisitions and mergers. In Baltimore, architecture firm RTKL, Inc. (Rogers, Taliaferro, Kostritsky, and Lamb) merged with the engineering, research, and computer software firm URS Systems of San Mateo, California in 1971; in Los Angeles, architecture firm Charles Luckman Associates was acquired by the New York-based conglomerate Ogden Corporation in 1968—a company with interests ranging from shipbuilding to restaurants to savings and loans.[5] At the same time, there were architecture firms that were also forming as corporations, which distributed power and work into diffuse and collaborative networks and legally enabled architects to acquire other firms. Motivated by "growth, profit, and performance," corporate architecture firms such as Caudill Rowlett Scott (CRS) in Houston,

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[3] Robert Gutman, "Architecture: The Entrepreneurial Profession," *Progressive Architecture*, (May 1977), pp. 39-40.

[4] Gurney Breckenfeld, "The Architects Want a Voice in Redesigning America," *Fortune* 84, no. 5 (1971), pp. 144–47, 198-99, 203-204, 206.

[5] Ibid., p. 203.

Texas acquired nearly thirty firms between the 1970 and 1990, and Daniel, Mann, Johnson, and Mendenhall (DMJM) in Los Angeles began to slowly acquire companies as early as the 1960s. By the end of the twentieth-century, DMJM grew to include nearly twenty subsidiary firms beneath its corporate name that ranged in service from architecture to real estate to data processing.[6]

While many of these increasingly large and multi-firm practices were short-lived and disbanded, including the dissolution of CRS in 1994, DMJM emerged as an enduring model of multi-firm corporate practice by the end of the twentieth-century that was able to withstand the turbulence of economic recessions during the early-to-mid-1970s and again during the 1980s. More revealingly, the practices at DMJM directly corresponded to the observations made by Alfred Chandler*,* as the term "conglomeration" emerged within discourse at DMJM during the 1970s. In the 1976 edition of DMJM's self-published journal, *DMJM Review,* the Vice President and Manager of the Architecture and Engineering division at DMJM, asserted:

> This professional conglomeration [DMJM] is called a 'multidisciplinary team'—and DMJM was one of the very first firms in the post-World War II era to assemble such an organization. That it has proven itself effective is evidenced by the fact that now many organizations are emulating the 'multidisciplinary' approach to building design.[7]

This use of the term conglomeration in 1976 came at a particularly revealing moment in architecture, when many firms in the US were in economic distress due to downturns in the construction industry; in contrast, DMJM's economic strength increased during the 1970s due to its business structure and culture of practice, which another architect at DMJM explained: "Our

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[6] Paolo Tombesi, "Capital Gains and Architectural Losses: The Transformative Journey of Caudill Rowlett Scott (1948-1994)," p. 157. For an overview of CRS as a business, see: Jonathan King and Philip Langdon, eds., *The CRS Team and the Business of Architecture* (College Station: Texas A&M University Press, 2002).

[7] W. B. Smith, "DMJM in Architecture," *DMJM Review*, September 1976, n.p.

services got wider and wider in the 70s…Once we started to get into M&As [mergers and acquisitions], our conglomerate structure really shot us to the top."[8] While the tendency of diversifying through corporate conglomeration was prevalent among industrial and high-technology organizations during the 1960s and 1970s, before declining during the 1980s, the practice of merging and acquiring diverse firms persisted from the 1970s onward at DMJM.[9] Beyond mere business structure, however, the term was used at DMJM to simultaneously describe the culture of architectural practice—as a firm fundamentally based upon social and economic equivalency. Pressed by a need to demonstrate the economic value of their work, architects began to view themselves as equals to a broader range of practitioners, which allowed DMJM to become a truly multidisciplinary firm, and it also made possible the development and acquisition of firms with services outside of the historically defined scope of architecture.

Despite the emphatic rhetoric of novelty associated with DMJM as a "professional conglomeration" and "multidisciplinary team," the term "conglomerate" was not universally accepted among all architects nor its business leaders.[10] Indeed, several vehemently denied such assertions, citing the fact that the subsidiaries and services of DMJM were all in some way related to architecture. This reluctance to embrace the term was due in part to its very ambiguity, but it nonetheless revealed an anxiety associated primarily with a multiplicitous view of

[8] Former business executive in discussion with the author, February 8, 2016.

[9] Lamoreaux, Raff, and Temin, "Beyond Markets and Hierarchies: Toward a New Synthesis of American Business History."

[10] In a special volume by *Fortune* in 1967 dedicated to the rise conglomerates, a strong resistance to the term by business leaders was correlated to the lack of specific form and pejorative connotations associated with antitrust evasion and monopolistic practices. See: *The Conglomerate Commotion* (New York: The Viking Press, 1970), p. 3. Those resisting the term at DMJM frequently argued that it was not until DMJM's successor firm, AECOM, ventured into financial services in the 2010s that the firm became a bonafide "conglomerate."

architecture that posed an ostensible challenge to modernist conceptions of architecture as a singular practice, with a definitive form: "DMJM was not a conglomerate," one business leader sharply concluded, "it was just an *extremely* diverse, modern firm…When you say mergers and acquisitions, I think you're missing what DMJM was all about."[11] Nonetheless, the inconsistent use and debate about the term conglomerate during the 1970s was echoed by debates in business literature as well as by the federal government, and it—at a minimum—suggested a new discursive formation within architecture practice that called into question the boundary, scope, and value of architecture under late capitalism. Conglomerate mergers, for example, were defined in the broadest of terms by the US Federal Trade Commission during the 1950s, which included three nearly all-encompassing categories, as either 1) market extensions, in which firms acquired similar companies but in different geographies; 2) product extensions, in which firms acquired others that were similar in work but did not directly compete, and 3) "pure" conglomerates, in which firms acquired others that were completely disparate in their function, service, product, or distribution.[12]

[11] Former business executive in discussion with the author, February 17, 2016.

[12] This definition appeared in amendments made to the 1890 Sherman Antitrust Act, which was the landmark statute that prohibited monopolies. The first amendments passed by the Clayton Antitrust Act of 1914 specifically prohibited price discrimination as well as mergers and acquisitions (under Section 7) if they were to lead to decreased competition. A second was the Celler-Kefauver Act in 1950, which is often referred to as the "Anti-Merger Act," which included provisions against acquisitions even by acquiring assets, and it prohibited vertical and conglomerate mergers if they were to result in reduced competition. In draft reports by the Federal Trade Commission in 1948, conglomerates were initially defined very specifically as "those in which there is little or no discernible relation between the business of the purchasing and the acquired firm," before concluding with a much broader application in the final 1950 amendment. *Federal Trade Commission on The Merger Movement: A Summary Report* (Washington, DC: Federal Trade Commission, 1948), p. 59. See: "Celler Kefauver Act," Public Law Ch. 1183-1184, December 29, 1950, pp. 1125-1128. Accessed November 12, 2017: http://legisworks.org/congress/81/publaw-899.pdf

The mere possibility of conglomeration for architecture, however, and the interest of architects in developing and acquiring subsidiary firms ranging from real estate to data processing, was predicated on a fundamental transition within the nature capitalism that encouraged new organizations of architectural work, as well as new categories of labor. It is also important to note, however, that these transitions were not immediate and did not occur all at once; instead, they were slow and occurred over the thirty years between the 1940s and 1970s. These transitions can be most clearly identified by two different types of shifts that together characterize the transition from a Fordist economy to a post-Fordist economy, during which time the relationship between capital and labor was redefined. A first way that work was defined under Fordism was by its adherence to economies of manual production: manual labor inputs were directly correlated to profit outputs, and work that was highly regulated, well-organized, and internally focused generally resulted in jobs that provided decent pay and security. A second means by which work was related to Fordism—one that was especially applicable to the work of architects—was in the process of production itself.[13] Architects could produce drawings more efficiently by adopting standardized, Fordist assembly processes of factory work, which enabled them to support the construction of a greater number of buildings and, in turn, earn more money. During the industrial resurgence of the 1930s, large American architecture firms, such as Albert Kahn Associates and Skidmore Owings and Merrill (SOM), embraced Fordism both in practice as well as in design philosophy, and drawings were produced in linear, multi-functional assembly-line processes; they were passed from design to engineering to construction

[13] While the distinction between labor and work has thoroughly theorized by Hannah Arendt, the terms are used together throughout this dissertation, as they were in modern thought. See: Hannah Arendt, *The Human Condition* (Chicago: University of Chicago Press, 1998).

administration.[14] By emphasizing the volumes of production, such as the Ford factories produced by Kahn's office or the office buildings by SOM's, such firms were thought to produce American consumers. As the co-founding architect of SOM, Nathaniel Owings, reflected on the formative beginnings of the firm, he notably declared that "to work, we must have volume…Volume meant power. We could try to change men's minds."[15] While historical accounts of SOM reveal how the firm's organization grew increasingly rigid in structure as it increased in size, Fordism was deemed too rigid as a mode of capital accumulation for some architecture firms. By the 1970s, Fordist economies and processes of work began to break down in favor of more flexible and fragmented means of production. By 1972, management consultant Peter Drucker published a revised edition of his 1946 *The Concept of the Corporation*, in which he argued that the concepts he initially laid out in his study of General Motors had become outmoded by a "post-Fordist" organization.[16] Under post-Fordism, the direct correlation between labor input and capital output was unhinged, which resulted in what David Harvey has referred to as "flexible accumulation," or what sociologists Scott Lash and John Urry have described as an economy of "disorganized capital."[17] For Harvey, this change disrupted work that was historically well-compensated and replaced it with jobs that were less permanent; workers were viewed as dispensable, and advancements in work no longer occurred within the existing silos of

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[14] On SOM, see: Giedion, "The Experiment of S.O.M." On Kahn, see: Hitchcock, "The Architecture of Bureaucracy and the Architecture of Genius." "Producer of Production Lines" Architectural Record (June 1942): 39–42. Zimmerman, "The Labor of Albert Kahn."

[15] Owings, *The Spaces in Between: An Architect's Journey*, p. 66. Despite resisting incorporation to remain a partnership, SOM remained a top ranked firm by measures of revenue and size, though DMJM surpassed SOM in 1990. See "The Top 500 Design Firms," *Engineering News-Record*, (April 1991).

[16] Peter Drucker, *Concept of the Corporation* (New York: The John Day Company, 1972), p. xvi.

[17] Harvey, *A Brief History of Neoliberalism*; Lash and Urry, *The End of Organized Capitalism*.

production, but instead in the development of new kinds of work at the "periphery." This shift in focus to the "periphery" of work, according to Harvey, enabled—and indeed encouraged—the merging and acquiring of firms, as well as extreme diversification, self-employment, joint-ventures, and outsourcing.[18] In architecture, the onset of post-Fordism meant that architects could begin to yield profits without expending any manual labor, such as the kind of labor historically associated with the production of drawings, and work was entirely set free from the demands of the consumer. Thus, by the 1970s, it was possible for novelty in architectural practice to become an end itself, and architecture labor was able to be described in terms of "ideas," "creativity," or "experience," as distinct from manual drawing labor. For Drucker, this shift corresponded to a third epoch in the history of capitalism. In the eighteenth century, he argued, a worker's knowledge was principally applied to his tools; in the late nineteenth and early twentieth centuries, a worker's knowledge shifted to productivity, and by the late twentieth century, he argued, a worker's knowledge was able to be applied to knowledge itself.[19]

The Origins of DMJM: A Firm of Equals

Before the term "conglomeration" emerged at DMJM in the 1970s, the firm had refined a culture of practice over the course of the 1950s and 1960s that allowed its founding partners to willingly embrace an expanded view of practice. The firm began in 1946 as a three-architect

[18] Ibid., pp. 147-152.

[19] Peter F. Drucker, *Post-Capitalist Society* (New York: Harper Books, 1993). For these historical parallels in architecture, see: Peggy Deamer, "Architectural Work: Immaterial Labor," in *Industries of Architecture*, ed. K. Lloyd Thomas, T. Amhoff, and Nick Beech (New York: Routledge, 2016). For a theoretical discussion of architecture's entry into the knowledge economy, see: Michael Speaks, "Design Intelligence and the New Economy," *Architectural Record*, (January 2002), pp. 72–79.

partnership, named Daniel, Mann, and Johnson, Architects (DM&J), in the oil-laden city of Santa Maria, California, nearly 160 miles north of Los Angeles. Like at many bourgeoning architecture offices in the mid-1940s, the three young architects, Phillip Daniel, S. Kenneth Johnson, and Arthur Mann, were optimistic about working within a postwar construction boom, since the first group of baby boomers prompted a shortage of school buildings in California, upon which the trio hoped to capitalize.[20] After graduating from the University of Southern California in Los Angeles in 1937, under the School of Architecture's first Dean, Arthur Weatherhead, Daniel first began working for a small Santa Maria architecture office, Crawford & Daniel Architects, which he directed after Crawford's death until 1942. Daniel hired S. Kenneth Johnson, one of his USC classmates and former childhood actor who starred in "The Young Rascals," to assist.[21] Crawford & Daniel Architects quickly became a family affair, as Daniel and Johnson hired a secretary, Margaret Peterson, whose soon-to-be-husband, structural engineer Irvan Mendenhall, was offered a consulting position as the firm's trusted engineer.[22] However, with the onset of World War II, material shortages inhibited new construction, and Crawford & Daniel closed. Daniel found short-term defense-related work at Kaiser Engineering, where he worked to design steel mills in Fontana, California, and where he also befriended chief

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[20] A number of other soon-to-be large architecture firms were founded also after World War II, including The Architects Collaborative in Cambridge, Massachusetts in 1945, and Caudill Rowlett and Scott in Houston, Texas in 1946.

[21] Johnson and his siblings were known within the film industry as the "Johnson Kids," starring in "The Young Rascals" and other films. Johnson was later a stand-in for actor Gary Cooper, and he worked in the art department at MGM while studying at USC. DMJM, *1946-1955 Daniel, Mann, Johnson, & Mendenhall* (Los Angeles, CA, n.d.), p. 4. AECOM company archives, Los Angeles, CA.

[22] Daniel was also in a relationship with Mendenhall's sister, Faye Mendenhall, and both couples were married in the early 1940s. See: *1946-1955 Daniel, Mann, Johnson, & Mendenhall*, n.d., p. 4. AECOM archives, Los Angeles, CA. The tendency of architectural partnerships to begin as family businesses was not uncommon. During the 19th century, for instance, Richard Upjohn's New York office epitomized a familial structure. See Woods, *From Craft to Profession,* p. 116.

architect Arthur Mann. Yet the war pulled the architects away from practice, and Daniel served as a Radar Officer for the Navy, Mann joined the Army Air Corps, Mendenhall served in the Navy Construction Battalion in the European theatre, and Johnson worked in the Pollock Shipyard in Stockton, California as a civilian. It was not until after the war, in February of 1946, that Daniel, Mann, and Johnson agreed to form an architecture partnership, named Daniel, Mann, & Johnson Architects (DM&J), in Santa Maria. They began by working in a small, single-room office on the second floor of the Motta Building in Santa Maria, and they initially divided work by "skill," as was common in early architecture partnerships: Daniel was the marketer, Mann was the designer, and Johnson was the "technical expert" (*Figure 2.0*).[23] Mendenhall was provided desk space in the office for his own engineering consulting practice, and he continued to work for DM&J in addition to four other firms. By the end of 1946, Johnson moved to Los Angeles with his family to open a second office in a 1,600-square-foot space in the Granada Buildings on La Fayette Park Place near Wilshire Boulevard—a 1927 white stucco complex of residential and work spaces designed by journalist-cum-developer/architect Franklin Harper (*Figure 2.1*).[24] By opening a second office in Los Angeles, the partners hoped to take advantage of a larger population of draftsmen and pool of construction work. However, they spent as much time on the road as in the office, frequently commuting between Santa Maria and Los Angeles in

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[23] The Motta Building was located at 306 South Broadway in Santa Maria. It was originally known as the Rubel Building and was demolished in 1976. DMJM, *1946-1955 Daniel, Mann, Johnson, & Mendenhall* (Los Angeles, CA, n.d.), p. 6. AECOM company archives, Los Angeles, CA.

[24] Charles Moore argued that the Granada Buildings "reek[s] of panache among Southern California's architecture and design community." See: Charles Moore, Peter Becker, and Regula Campbell, eds., *The City Observed: Los Angeles: A Guide to Its Architecture and Landscapes* (New York: Vintage Books, 1984), p. 146. On the initial details of the construction of the Granada Buildings, see: "Trio of Major Units to Rise: Three Projects Announced to Cost $1,000,000 Each; Unique Structure Goes Up at Lafayette Park Place; Temple and Store Addition Figure in Activity," *Los Angeles Times*, October 2, 1929," p. E1.

Daniel's pre-war Coupe, Mann's aging Ford Mercury, and Mendenhall's 1940 Pontiac.[25] And, despite the promising construction booms, including a steady stream of new school buildings for the Los Angeles Unified School District as well as for Culver City, the first three years of work were financially turbulent, and the plan to specialize in only school buildings—with only a few small commercial buildings—proved to be riddled with economic problems.[26]

By the end of 1949, the firm had increased to 40 employees, though the inability of the partners to make a living—let alone a profit—challenged the viability of an informally organized, architects-only office. Despite a steady stream of commissions, each partner was nearly bankrupt, and according to the firm's historical record, "DMJM employees were consuming eight dozen donuts a day, but only paying for seven. A five dollar loss each week ate into the profits, so to speak."[27] While the architects claimed to be decent "salesmen," Daniel downplayed the idea that they were proficient businessmen, arguing that "what we knew about running a business you could stick in your ear."[28] This tendency of downplaying business knowledge by architects and engineers was common among business leaders at DMJM

[25] Several of the school projects were featured in design publications, including the Atascadero Elementary School, which appeared in the November 1948 issue of *Progressive Architecture*. Others included the Culver City Combined Intermediate and High School, which was Culver City's first school, the Ladera Elementary School in Manhattan Beach, Torrance High School in Torrance, and the Whaley Junior High in Los Angeles, among others. DMJM, *1946-1955 Daniel, Mann, Johnson, & Mendenhall* (Los Angeles, CA, n.d.), p. 6. AECOM company archives, Los Angeles, CA.

[26] In DMJM's self-produced history, national historical markers were paired with DMJM's achievements, including average transportation costs, important political events, or terms of popular culture. In the year 1946, for example, when DMJM began, the account notes: "Levittown was started; Philippine independence; Population: CA 6,907,400/US: 132,164,600; Median age in U.S.: 29; First Baby Boomer Born; First UN Session; First Digital Computer Dedicated; *Baby and Child Care* by Dr. Spock; "Notorious" by Hitchcock; Chicken was $1.00 per pound; A new Crosley Four-Passenger Convertible was $250; The Bikini Previewed; Atomic Energy Commission Established; New Terms: Automation, Electric Blanket, Ranch Style. *1946-1955 Daniel, Mann, Johnson, & Mendenhall*, p. 6. AECOM company archives, Los Angeles, CA.

[27] DMJM, *1946-1955 Daniel, Mann, Johnson, & Mendenhall*, p. 5. AECOM company archives, Los Angeles, CA.

[28] Seymour Freedgood, "'Dimjim': Architects for the Space Age," *Fortune* (August 1960), p. 124.

throughout the firm's history, including engineer Richard Newman, the firm's Chief Operating Officer during the 1970s and eventually a founding father of AECOM, who argued that "what I knew about running a company was based on ten shares of IBM stock that my great aunt had given me. I didn't even know where Wall Street was."[29] This juxtaposition of Daniel and Newman's anxieties, however, reveals the fundamentally different concerns of business that pervaded the firm by the 1970s: finance, investment, stocks, and profit.

During the late 1940s, Daniel and Johnson took turns in the hospital due to stress-induced ulcers, and the firm had a net-worth of only $18,000 with a borrowing limit of $5,000.[30] A retrospective account of the hardship was outlined in a 1957 issue of *Management Methods*, in which the shape of the partnership was described as "sagging," with each partner blaming the others for the firm's "profit-sapping problems."[31] The incredible pressures of business led to sharp disagreements about the direction of the firm, which spiraled into animosity between the partners, including clashes of "personality."[32] At first, the trio resorted to psychological tests to try to understand the source of personal friction, but they determined that at the core of the contention was a lack of a clear business structure, written growth plans, and profit.[33] While many architects after the war sought to replicate the managerial tendencies of big business, Johnson was tasked to study other architecture firms for potentially profitable business models,

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[29] Richard Newman in discussion with the author, March 2016.

[30] "Profile of a New Kind of Manager" *Management Methods* (September 1957), p. 27.

[31] Ibid.

[32] Ibid., pp. 27-30.

[33] "Daniel, Mann, Johnson & Mendenhall: How Teamwork Has Built a Thriving Architect-Engineer Firm," *Southwest Builder and Contractor*, September 27, 1957, n.p. Stanley A. Moe papers, Huntington Library, San Marino, CA.

and he learned that independent management consulting firms had begun to advise architecture firms. Chicago-based architectural firm Perkins & Will, for instance, which was formed a decade earlier than DM&J, was similarly struggling with waning school commissions, and it owed a new growth plan to management consulting firm Booz, Allen & Hamilton (BAH), which was also based in Chicago. The hiring of BAH for Perkins & Will resulted in "wholesome profits" that enabled its partners to spend, in the eyes of the DM&J partners, "more time on the golf course than in the office."[34] Though already much larger and more established than DM&J, Perkins & Will maintained economic stability by diversifying the types of projects they offered in accordance with BAH's recommendations.

While accountants and attorneys alike were historically instrumental as advisees to architects as they were starting their own firms, BAH's deep involvement in the organizing and maintaining of architecture firms indicated a new relationship between architecture and business, especially since the relationship functioned at the level of firms, rather than individuals. BAH was a bourgeoning consulting firm that practiced statistical analytics beginning in 1914 and emerged as an important management consulting firm after World War II, offering consulting services for companies that ranged from the Radio Corporation of America (RCA) to Johnson Wax to the US Air Force and Navy to the National Security Agency.[35] For Perkins & Will, BAH was viewed as a "catalyst," and the management consultants assisting Perkins & Will based their

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[34] "Profile of a New Kind of Manager: How to Pack Pleasure and Profit into a Partnership," p. 28. Ironically, the consultant from Booz Allen Hamilton who worked most closely with Perkins and Will, Ed Burnell, died while on a golf course. Lawrence Bradford Perkins, Oral history of Lawrence Bradford Perkins, F.A.I.A., interview by Betty J. Blum, 2000, Department of Architecture, the Art Institute of Chicago, p. 79.

[35] Edwin Booz initially began BAH in 1914 to focus on the "human element" of business rather than efficiency, which was a widespread management strategy that was also attractive to the US military as a way to help prepare for war. By the 1960s, for instance, BAH had contracts with 75 percent of the country's large businesses and 66 percent of all departments of the federal government. See: "Management Experts Thrive on Own Advice," *Business Week*, April 23, 1960, p. 106.

analysis on a series of self-reflecting questions about how profitable and large the partners wanted the firm to be.[36] DM&J followed suit and hired BAH to help identify inefficiencies in the business, as well as to develop long-term economic procedures and objectives. BAH sent one of its youngest consultants to DM&J, Douglas Russell, who, upon his arrival, found work that was unbilled, stacks of bills that were unpaid, and no business plan in sight (*Figure 2.2-2.3*). After an initial six-week survey, Russell drafted a new structure for DM&J that was based on the partnership structure of BAH itself (*Figure 2.4*).[37]

Russell's primary focus was on the relationships between the partners and their ability to efficiently manage the firm's finances and earn significant profits. Most importantly, he insisted that each partner should approach their work with the other partners objectively and as an equal counterpart, and he demanded that each be familiar with all aspects of the practice. Additionally, each partner was to be paid the same salary of seventy-five dollars, although they were only permitted to bring half home. The remaining half was partially held for taxes, while the rest was kept at DM&J for "plowing back into the business."[38] Daniel argued that "most professionals tend to live too high on the hog; they live up all the profits and then some. Our aim is to increase

[36] Despite the consulting advice from BAH, Perkins & Will did not have enough money to hire BAH to complete a full survey of the firm. Larry Perkins and Phil Will argued that most change in business structure at Perkins & Will came from John Goodall, who was hired as the manager-cum-full partner in 1946. Goodall was both a lawyer and real estate executive for Marshall Field and he established the firm's first accounting system, which included providing a limit—of $7,000 ($101,000 in 2018 value)—to the amount of money each partner could glean from profit annually, to help build up a substantial economic cushion for the firm. In addition, Goodall wrote the firm's manual of organization. See: Frank Fogarty, "Architecture at a Profit," *Architectural Forum* 107 (September 1957), pp. 128–31, 214.

[37] "Profile of a New Kind of Manager" *Management Methods,* pp. 27-28. After an initial six-week survey, Russell signed a 12-month contract as a business manager, with a stipulation that he would have complete control of finances and organization, and he demanded partner salary in addition to 40% of the firm's total profits. Since this deal still promised more than they had made in the past, he was hired.

[38] "Six Partners with Six Personalities," *Business Week*, January 19, 1957, p. 184.

our personal standard of living slowly and use the rest of the money to build permanence and stability into the firm."[39] It was indeed this very surplus with which the firm would develop and acquire additional firms beneath its own umbrella in subsequent decades.

Adapted from BAH's own office, the partners at DM&J agreed to a clear division of work and to a formalized "Code of Partnership Ethics," which read, in part:

> Acceptance by each member of the management of his firm of his pro rata share of responsibility for the getting of the business and the handling of it.
>
> Unwillingness on the part of all members ever to speak disparagingly of another member to anyone.
>
> Willingness on the part of all members to face all firm problems objectively and dispassionately.
>
> Acceptance by each partner of his responsibility to protect the interests of other partners when delegated the authority and responsibility to act for the other partners.[40]

The emphasis on "dispassion" and the eradication of personal disagreements was described by sociologist Pierre Bourdieu as a particular characteristic of large-scale cultural production, in which he borrowed Milton Friedman's 1970s quip to argue that, unlike smaller, avant-gardist cultural practices, "business is business," and as such there is no room in business for "feelings."[41] This position in architecture was not new, however, as one architect argued at the beginning of the twentieth-century, that architects were "creatures of moods and emotions, and

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[39] Ibid.

[40] "Profile of a New Kind of Manager: How to Pack Pleasure and Profit into a Partnership," p. 30.

[41] Pierre Bourdieu, *The Field of Cultural Production: Essays on Art and Literature* (New York: Columbia University Press, 1993), p. 62.

as these elements have neither responsibility, quantity nor standard, he is therefore himself unaccountable, unsubstantial and unreliable."[42]

In an effort to ensure that all of the partners understood the value of each facet of the firm, Russell initiated a five-year system of "musical chairs" in which the partners took turns working in each role of the firm, rotating between positions of business development, construction supervision, architecture and design, and general management. Russell's ultimate goal was not for each partner to acquire the skills of each position; instead, it was for them to acquire the knowledge—through experience—of what each position entailed. Russell's report concluded by arguing that architecture firms most likely to thrive after the war would be those that: 1) integrated architecture and engineering services; 2) recognized each contributing professional as equals in terms of social and economic value; and 3) diversified their project types—from school to military to commercial to industrial projects—since specialization subjected the firm to the peaks and valleys of the economy.

Following Russell's recommendations, DM&J immediately acquired Irv Mendenhall's engineering firm and he became a full partner, since DM&J was already out-sourcing nearly fifty percent of its engineering work to his office.[43] In 1950, Mendenhall's addition resulted in a new firm name, Daniel, Mann, Johnson, and Mendenhall, Architects and Engineers (DMJM), and in 1952, the firm moved to its second Los Angeles location, from the Granada Buildings to an office building on Sunset Boulevard, where the firm remained for the next four years (*Figure 2.5*). Russell also became a partner and general manager of the firm, though his name

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[42] Harder, "Architectural Practice--an Art and a Business," p. 74.

[43] The running internal joke was that DM&J actually owed Mendenhall money, and the only way to pay off the debt was to add Mendenhall as a full partner. Former architect in discussion with the author, July 28, 2016.

paradoxically did not make its way into the firm's title, which suggested that, despite the rhetoric of equivalency, business was not yet able to be viewed as fully comparable to architecture and engineering. Although the rhetoric of integrating architecture and engineering represented a particular characteristic of modern architecture and engineering firms, including at Albert Kahn Associates and The Austin Company prior to World War I, and Skidmore Owings & Merrill prior to World War II, the attempt to socially level the work of architects, engineers, and business managers did not occur until after World War II.[44] When engineer John Merrill first joined SOM in 1939, for instance, he was only a limited partner, despite the fact that his name was equally represented in the firm's title. Just as Mendenhall joined DMJM in 1950, Merrill was finally embraced at SOM as a full partner in 1949.[45] However, even after becoming a full partner, historians have argued that architecture at SOM remained as a single frame of practice, rather than allowing both engineering and architecture to take on their own, yet still-integrated forms of practice.[46] Moreover, even after the 1950s, SOM maintained a pre-War multi-functional form of organization that adhered to a Fordist assembly-line system of work, with drawings passing from design, to production, to construction, which, according to histories of industrial organization, was desirable due to the ability of practitioners to exploit economies of scale

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[44] Unlike DMJM, which owed its organizational structure to management and accounting experts, SOM claimed that its long-term survival was due to its legal counsel, Marshal Grosscup Sampsell, who negotiated their contracts and extended lines of credit as the firm began. Nat Owings described him in contrast to Skidmore or Owings, as "orderly," "calm," and "cautious." Though he was an essential part of the organization since 1936, he remained detached from it. Owings noted that the partnership documents by which SOM operated were always changing and hardly written down: Sampsell himself epitomized the law and operating agreements. See: Owings, *The Spaces in Between: An Architect's Journey*, p. 70.

[45] Jung, "Organization and Abstraction: The Architecture of Skidmore, Owings & Merrill from 1936 to 1956."

[46] For an overview of the history of total design services, from medieval guilds to the Bauhaus to SOM, see Boyle, "Architectural Practice in America, 1865-1965--Ideal and Reality."

(*Figure 2.6*).[47] However, by diversifying services and structuring the firm with divisions, rather than parts of the production process, as Alfred Chandler described, firms could build on their managerial authority by wielding it over an increasing share of the economy. Architects, engineers, and business managers routinely described DMJM in sharp contrast to SOM, as an economy of means rather than of scale—with a fully-integrated, multi-divisional structure. Both architects and engineers were semi-autonomous and responsible for their own projects, as well as for working together on larger projects that occasionally required a blurring of professional lines. With no particular project specialization or reproducible aesthetic logic, multi-divisional firms such as DMJM were positioned more favorably toward growth in a number of industries and geographies, rather than strictly in architecture.[48] One business leader at DMJM explained the firm in contrast to other large architecture firms:

> The single most important difference about DMJM was that architecture and engineering was under one roof. There was no other firm—SOM or others—that incorporated engineering as an equal part of the firm…DMJM represented the concept of a multidisciplinary firm in which all of the disciplines were equal, whether it was the economist, urban planner, architect, mechanical engineer, structural engineer, financial people, or marketing.[49]

With architecture and engineering services both completed in-house, the architects and engineers maintained independent responsibility for their own streams of revenue. Yet as a testament to the multidivisional and multidisciplinary approach, the engineers generated as much revenue as the architects well into the 1970s, and drawings were often produced over the same desks—with

[47] Jean Tirole, *The Theory of Industrial Organization*, 7th ed. (Cambridge, MA: The MIT Press, 1994), p. 18.

[48] Ibid., p. 48.

[49] Former business executive in discussion with the author, February 8, 2016.

architects and engineers filtering in and out as needed, rather than the drawings from one table to the next.[50]

Unhinging Capital from Labor: A Post-Fordist Turn

Relinquishing their roles within daily business operations to focus instead on long-term financial planning and to weigh the potential risks of incorporation, Phillip Daniel and Douglas Russell devoted their time during the second half of the 1950s to drafting firm objectives and plans for diversifying DMJM, during which time the line between architectural work and business work grew increasingly blurry. By the end of the 1950s, new military commissions provided DMJM with an international presence, which is described in Chapter 3, and the firm had offices in England, India, Japan, France, and Panama. In 1958, DMJM was ranked by *Architectural Forum* as the second "biggest" architectural firm in the US, as measured by the dollar value of construction for which each firm was responsible. By then, DMJM employed 480 people and had surpassed Perkins & Will, Albert Kahn Associates, and SOM in revenue, though still not in size. This suggested that profit, rather than size, had become a new metric of power and merit in architecture practice. Perkins & Will, Albert Kahn Associates, and SOM employed 180, 200, and 1,060 people respectively, though they began to fall in revenue-based rankings between 1957 and 1958.[51] This strong economic performance by DMJM was a testament to the

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[50] Ibid.

[51] The Detroit architecture and engineering firm Giffels & Rossetti was ranked as the "biggest." Between 1957 and 1958, Perkins & Will dropped from the 9th spot to the 34th; SOM dropped from 2nd to 11th; and Albert Kahn dropped from 7th to 12th. SOM, however, did not report data in 1958, so the numbers for SOM in 1958 were based on 1957 revenue data. These positions changed quite readily over the next several decades, as SOM and DMJM often traded positions. Editors of Architectural Forum, *The 1959 FORUM Directory of the 100 Biggest Architects, Contractors, Clients* (Time, Inc., 1959); Editors of Architectural Forum, *The 1958 FORUM Directory of the 100 Biggest Architectural Firms, Building Customers, Building Contractors* (Time, Inc., 1958).

diversity of its projects, and it also reflected the strengths of the Los Angeles economy at the time, due to a confluence of aerospace, high-technology, and entertainment industries. In 1958, the firm was recognized by the City Council of Los Angeles for its business strengths, as well as for its contributions to the city's business growth (*Figure 2.7*).

In order to build on their already-strong economic performance, the DMJM partners pressed forward by incorporating the firm in 1960.[52] Corporations were relatively anonymous entities positioned for maximum profitability and helped to reduce personal liability, while partnerships still legally emphasized the named individuals at the top of a hierarchical organization. Nonetheless, nineteenth-century partnerships were still the most prevalent forms of professional architectural practice, as historian Mary Woods has argued, even though economic models favored corporations.[53] Since corporations represented a legal arrangement between a state and a company, DMJM incorporated in California in 1960.[54] With incorporation, Mendenhall assumed the position of President, which rested beneath a corporate Board of Directors. A sixth partner, architect Stanley Moe, was hired, as well as an additional principal, Tevfik "Tef" Kutay, who oversaw Business Development—both of whom added a greater distribution of power to the firm and offered insights that began to transcend the founding partners. By 1960, the firm offered six services, including Master Planning, Architectural Planning and Design, Engineering Planning and Design, Systems Engineering, Construction

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[52] By the end of the 1950s, DMJM's work was comprised of: ten percent industrial, twenty-three percent office, twenty percent schools, seven percent hospital and institutional, and forty percent "other." See: *1956-1965 Daniel, Mann, Johnson, & Mendenhall*, n.d., p. 6. AECOM archives, Los Angeles, CA.

[53] Woods, *From Craft to Profession*, p. 121.

[54] While DMJM incorporated in California in 1960, DMJM initially incorporated its internationally practices as DMJM International in 1954. "Organization for Efficient Practice: Daniel, Mann, Johnson, & Mendenhall, Architects & Engineers," *Architectural Record*, June 1960, p. 192.

Management and Supervision, and Process Engineering, and the firm's employees were described as wide-ranging in their skill to enable the firm to compete for projects with greater complexity. The employees not only included architects and structural engineers, but also nuclear engineers, physicists, mathematicians, microwave engineers, surveyors, and statisticians.[55]

By the time of incorporation, DMJM had moved offices again, from the Sunset Boulevard office to a third and larger Los Angeles office, at 3325 Wilshire Boulevard in 1956, where DMJM remained until 1971 (*Figure 2.8*). In striking contrast to the messiness of paperwork and clustered desks that typified the firm a decade prior, drafting tables were now rigidly organized in long rows that were unobstructed by walls or columns, at which (mostly) men with white buttoned-down shirts and black ties worked, while women secretaries were the face of the office. Thus, incorporation ushered in a kind of clean, white, and orderly image of practice for DMJM, which was captured by Los Angeles-based photographer Julius Shulman (*Figure 2.9-2.12*). The photographs of DMJM's office resembled those of Booz Allen Hamilton's, as well. BAH was routinely featured in business journals such as *Management Methods* and *Business Week*, in which the efficiencies of their office were conveyed through photographs. In two contrasting photographs of the office in a 1960 article in *Business Week*, titled "Management Experts Thrive on Own Advice," seven men appeared facing each other around a conference table, as the "Executives" who "set policies" for the firm as a whole, while in a second photograph, women were advertised *as* the office, scurrying about and efficiently stacking and ordering paperwork (*Figure 2.13-2.14*).[56] At DMJM, the gendered division of labor

[55] "Organization for Efficient Practice: Daniel, Mann, Johnson, & Mendenhall, Architects & Engineers," p. 192.

[56] "Management Experts Thrive on Own Advice."

was similarly pronounced, with women primarily responsible for secretarial work and described as the primary public face of the office, while the executives were men who made the firm's decisions.

Despite these deliberate demonstrations of order and standardized work, it was in the organization of the firm itself, rather than in the images of the office, that the first evidence of a post-Fordist shift was visible. The firm was organized into three divisions in 1960. Two were for operations, and one was for future development, and they were titled: Domestic Operations Division, Foreign Operations Division, and Business Development Division (*Figure 2.15-2.16*). The overarching firm organization chart reflected an overwhelming attention to administration and business development rather than to design work, as well as an emerging distinction between manual and non-manual architectural labor. A 1960s company brochure noted that "at DMJM, it [management] is multi-faceted…it is detached from product or method but it is united through interlocking skills and shared responsibility."[57] More importantly to the firm as a whole, however, the firm organization chart reflected a clear emphasis on the so-called "periphery" of architecture, rather than its core: toward new markets, clients, and external relationships. Each Executive Vice President—the partners—was responsible for duties both on the corporation's governing Board of Directors, which enabled the removal of individuality except in the firm's name, as well as for the marketing of new work respective to each partner's individual interests. The tasks of marketing and procuring new work, however, were diagrammed as part of the firm's organization chart as a semi-autonomous subsection, with a title that appeared to define it as an independent entity altogether, as the "Organization for Clients & Projects." More tellingly,

[57] *Company General Brochure: A Presentation of the Work of Daniel, Mann, Johnson, & Mendenhall*, 1967. Stanley A. Moe papers, Huntington Library, San Marino, CA.

this work was connected to the firm only by dashed lines, and it connected precisely at the mid-point between "Operations" and "Business Development." The dashed line exemplified a distinction between manual drawing labor and business labor, though both were done by architects; therefore, the chart confirmed an early shift from Fordist to post-Fordist practice, since "Operations"—which was primarily understood to mean the production of drawings—was now understood to be only indirectly connected to the marketing, supervision, and overseeing of the firm's business development. Within the "Organization for Clients & Projects," Daniel was responsible for procuring and overseeing "Commercial and Systems Operations," and he secured international defense projects, including an Air Force base in Okinawa; Mann oversaw "Institutional" Projects and worked locally on school and commercial projects that covered Southern California; Johnson oversaw the "Military Industrial" group and worked on domestic military missile testing and launching facilities, such as the nation's first fully "hardened" ballistic missile program, the Titan I; Mendenhall was responsible for "Engineering Projects" and worked on projects that ranged from dams in India to wastewater treatment facilities in California; and Moe focused primarily on special joint-venture projects, both in England and the US.[58] These external relationships provided both stability and a steady stream of diversified projects to the office, but they also suggested that DMJM was as focused on the organization and control of the firm as it was on the opportunities that lay at its disciplinary and geographical periphery. This interest in the periphery was confirmed in a 1960 article in *Architectural Record,* in which the editors described DMJM as a firm that explicitly emphasized its "Extra-Professional Activities":

[58] "Daniel, Mann, Johnson & Mendenhall: How Teamwork Has Built a Thriving Architect-Engineer Firm," n.p. Stanley A. Moe papers, Huntington Library, San Marino, CA.

> Growth of the DMJM practice has brought with it an increasing awareness of, and participation in outside activities by the firm members and employees. Increasingly, it has become apparent that the progress of the organization, dependent as it is on efficient service to its client is almost equally dependent on the outside activities of the firm. So DMJM gets itself involved (as a firm and individually) in a great number of civic and other peripheral pursuits… In this way, the firm and its members become more important and integral members of their communities and of society than would be possible within the strict confines of professional practice.[59]

As a direct result of the increased division and diversification of work, as well as the semi-autonomous nature of the practice, new standards were required to be written, including business procedures, organizational charts, protocols, and contracts. The writing of these documents, as well as the assembling of a corporate ladder, constituted a new and alternative kind of architectural work, as business documents were meticulously outlined and—importantly—revised and updated. The documents were collected in a *Standard Practices Manual,* which outlined the firm's goals and included diagrams of firm hierarchies, standard contract forms, purchase orders, as well as specific protocols and procedures (*Figure 2.17-2.20*). While business manuals in architecture practice were not entirely new, since there were few that were used in offices as early as the turn of the twentieth-century, they were historically viewed as the kind of work performed by business consultants, lawyers, or other architects outside of the firm. In the manual prepared for McKim, Mead & White, for example, the *Manual of Office Practice* (1922), by architect Frederick J. Adams, clerical work was integrated into the routine of architecture, and it was described as a "manual of office practice for the architectural worker; a concise tabulation of instructions covering the routine of an architectural office for the information of the workers therein and all others having to do with building construction."[60] By the 1960s, the writing of

[59] "Organization for Efficient Practice: Daniel, Mann, Johnson, & Mendenhall, Architects & Engineers," p. 193.

[60] Frederick J. Adams, *Manual of Office Practice: Compiled for Use in the Office of McKim, Mead & White* (New York: Charles Scribner's Sons, 1922).

office manuals from within the practice was more common, and they could be found in architecture firms ranging from large firms, such as DMJM's, to small firms, such as Richard Neutra's.[61] At DMJM, the manual detailed hiring procedures and protocols of employee conduct in excruciating detail, including uniform rules that set a maximum age of employees to sixty-five years old (with only rare exceptions granted until the absolute age of seventy-two), a maximum allocation of money to be spent on flowers as condolence gifts for important events of employees' family members ($10.00 for a funeral; $7.50 for a new baby or illness), and a mandatory maternity "termination" for women after their sixth month of pregnancy (*Figure 2.21-2.22*).[62]

More significant to the work processes of the firm, the manual also included a section dedicated to "procedures" for typical projects, written in 1966. In the typical procedures for domestic architecture and engineering projects (*Figure 2.23*), work was broken down on a spreadsheet into a checklist of twenty-three steps that were ordered vertically, beginning with "Programs," such as the "development of" and "negotiations with" a client, followed by "Production" and then "Construction." While the flow of work echoed the spirit of a Fordist assembly-line structure, both architecture and engineering were fully integrated in a single division of the firm, and the checklist, with its rhetoric of "procedure," was intended to impart a view of practice in which the processes were fully routinized. Further, the checklist also made visible the ways in which power was widely distributed among multiple overseers, rather than

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[61] For a wide range of excerpts from manuals in architecture practice since the turn of the twentieth century, see: Eva Franch i Gilabert et al., eds., *OfficeUS: Manual* (Zürich: Lars Müller Publishers, 2017).

[62] See: "Age Limits," "Employment of Friends and Relatives," and "Maternity Terminations," in DMJM, *Standard Practices Manual*, Dec 15, 1965. Stanley A. Moe papers, Huntington Library, San Marino, CA.

merely one. At each step of the process, there were up to eleven different approvals, ranging from the Project Architect to the General Manager.

Finally, the overall expansionary thrust of the firm was outlined by the manual in a section titled “intra-company relationships,” added in 1969, which described the firm as non-hierarchical in its social structure and explicitly oriented “outward”—attuned to the political and economic structures “outside” the firm. Two of the clearest intra-company goals were outlined as:

> a) Avoidance of status levels, one organizational unit relative to another
>
> b) Emphasis on the *peripheral* organization elements which constitute our primary relationships to the outside world and clientele.[63]

Firm as a Stable: Firms within Firms

While the shift from a partnership to a corporation provided DMJM with legal benefits primarily related to liability and taxes, it also reinforced the firm itself as an irreducible unit—surpassing the individual—of capitalist development. Accumulated surplus capital was used to align with or acquire companies beyond DMJM, since the corporation as a legal entity functioned much like an individual. DMJM’s articles of incorporation rid it of any remnant of individuality except in its name, defining the company as a human-like body able to “acquire, by purchase or otherwise, the goodwill, business, property rights, franchises and assets of every kind...of any person, firm, association or corporation.”[64] As new expertise was needed, entire companies and their assets were acquired, rather than merely hiring the chief laborer himself,

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[63] Emphasis added. “Intra-company Relationships,” in DMJM, *Standard Practices Manual.*

[64] DMJM, “Articles of Incorporation of Daniel, Mann, Johnson, & Mendenhall,” February 1, 1960. Filed by Frank M Jordan, Secretary of State, California.

which was a strategy for expanding into new markets, geographies, and for mitigating competition. An early example was in 1965, when the engineering division of a small architecture and engineering office, Alexander & Dorman Architect/Engineer, of Hanford, California was acquired, so that its founder, architect and engineer Albert Dorman—who was formerly the Civil Engineer of record for Disneyland in California—could work for DMJM as Engineering Project Director. Dorman was elevated to oversee all corporate development by 1970 and he was named President and then Chief Executive Officer of the firm in 1977.

Architectural work in the US surged during the 1960s, and architectural and engineering work was also subjected to new measures of evaluation, as a 1961 *Engineering News-Record* (ENR) described firms as either "winners" or "losers" based principally on their ability to be "money-makers" (*Figure 2.24*).[65] More importantly, the editors of *ENR* noted that many firms "beat the market with profitable sidelines" by forming "capital-heavy" supplemental practices that could support those that were more traditionally "labor-heavy."[66] In 1964, the *ENR* published what would continue as its annual rankings of "Top 500" design firms based entirely on firm revenues, which provided an alternative metric of merit to design awards. According to the *ENR* report, if a firm did not make the revenue-based list of top firms, it was considered a "loser." By the 1966 *ENR* listing, DMJM was listed as the second largest architecture and engineering firm by revenue—second only to the engineering firm Giffels & Rosetti of Detroit.[67] These rankings were important markers of status at DMJM, and the firm remained in the top ten;

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[65] *Engineering News-Record*, (May 1961).

[66] Robert J. Stinson, "The Money-Makers (and Some Losers): What the Reports Show," *Engineering News-Record*, (May 1961), pp. 212–13.

[67] "The Top 500 Design Firms," *Engineering News-Record*, July 1966.

it was ranked fourth by size and ninth by revenue by 1968, and DMJM's partners were so thrilled that they printed a flyer to circulate internally, upon which they printed the definition of "synergism"—the collective momentum gained by consolidating resources in order to reduce costs and the price of services (*Figure 2.25*):[68]

> …what we think is important about the record is not just the size ranking. It's the way the size was attained—by a combination of single individuals and specialized operating units joined together to provide each client with the right kind and degree of personal service and professional expertise. The dictionary definition is 'applied synergism, cooperative action of discrete agencies so that the total effect is greater than the sum of the single effects taken independently.' As a philosophy, this expresses DMJM's belief that the whole is made up from the many and that the many are as important as the whole.[69]

Following the post-Fordist logic of disengaging capital outputs from manual labor inputs, the partners agreed that, by the end of the 1960s, the revenue accumulated by the direct labor of architects and engineers within the firm would not be enough to maintain a position of stable economic power. As a result, subsidiary companies were laterally formed or invested in as renewable sources of capital, and DMJM began to take on the shape of a firm with many firms within it. As DMJM began to develop and acquire subsidiary companies at the "periphery" of architecture practice, the logic and boundary of the firm also became more porous. As one DMJM newsletter concluded, subsidiary firms challenged the boundary of the practice and also revealed how the term "design" could be applied to the composition of the firm itself:

> …with professional specialization, with design used only as decoration, with single personalities presenting single solution approaches, design in architecture has declined in its ability to express either order or strength, energy or beauty. DMJM, a firm with many linked and branching talents and an association of creative professionals, has sensed the

[68] "The Top 500 Design Firms," *Engineering News-Record*, May 1968. The top firms by revenue were predominantly engineering firms, with Howard, Needles, Tammen & Bergendoff ranked first, DeLeuw, Cather & Co. ranked second, and Sargent & Lundy Engineers ranked third. DMJM was the highest ranked firm in which architecture was included, and SOM was ranked sixth.

[69] Miscellaneous. Stanley A. Moe papers, Huntington Library, San Marino, CA.

gropings [*sic*] of architecture toward a wider concept of itself.[70]

As a demonstration of the firm's interest in widening the "concept of itself," a revised organizational chart, published in 1972, revealed a patent regard for the "periphery" of architecture, explicitly through affiliated and subsidiary organizations, and it demonstrated that post-Fordism had arrived in full form within architecture by the 1970s (*Figure 2.26*). Not only did the publication of the revised chart immediately precede a sharp recession in building construction in 1973, but it also coincided with the consent decree issued by the American Institute of Architects, under pressure from the Department of Justice, which argued that the AIA's anti-competition stance violated antitrust law. In addition, it also coincided with the publication of business guru Peter Drucker's revised synthesis of the corporate form, in which he announced a post-Fordist turn.[71] In DMJM's new organizational chart, work was organized in "groups," with divisions still organized beneath them. This included a fully integrated "Architecture and Engineering Group," supervised by a group manager, partner Ken Johnson, as well as a manager of a Design Division, architect Anthony Lumsden, who was hired by DMJM in 1964 and oversaw all architectural and engineering departments by 1968, which were separated by projects into two categories: commercial and community projects (*Figure 2.27*). Yet the terms "Design" and "Architecture" were not used interchangeably, however, as the entire division was named "Design," though within it, there was also a "Design Department" that was

[70] "The Shaped Objects of Design," in DMJM, *DMJM News*, no. 2 (1964), p. 1. W. Coburn Papers, Los Angeles, CA.

[71] The construction recession was most severe between 1973 and 1975, after which annual rates of recovery slowly and unsteadily improved until 1982. By 1983, annual growth surged. Magali S Larson, *Behind the Postmodern Facade: Architectural Change in Late Twentieth-Century America* (Berkeley, CA: Univ. of California Press, 1995), p. 257. Also see: Blau, *Architects and Firms*, pp. 114-119.

distinct from “Architectural Services,” in which the primary drawing “production” was done. Thus, the labor of design, at least rhetorically, was detached from the labor-intensive production of drawings.

Perhaps more indicative of the firm’s broader socio-economic change during the 1970s were six independent organizations that appeared on the chart, including a real estate company and a data processing company, that were listed beneath a title of “DMJM Affiliate Organizations.” These were entirely detached from the DMJM office—no longer attached to the firm by lines that were able to be physically diagrammed—and thus they problematized the very structure of an organizational chart as a device through which one could comprehend an architectural firm. Lines that traditionally connected each function no longer applied, since the relationship between the affiliated companies to DMJM was primarily economic and thus could not be physically drawn.[72] As an even further demonstration of the post-Fordist reconfiguration of labor’s relationship to capital, the labor of architectural work was described as oppositional in its facing to capital: each affiliate company was described as a major “profit center” for DMJM, and in the same 1972 article of *Progressive Architecture* in which DMJM published its organizational structure, the drawing work traditionally associated with architecture and engineering was described as internally-focused and “labor *intensive*,” while its accumulated subsidiaries and affiliated companies—the so-called “profit centers”—were described as externally-focused and “capital *extensive*.”[73] Nonetheless, despite this professed disconnect

[72] Even in the pre-War beginnings of SOM, for instance, the founding partners were also not able to make a profit by architecture alone and were reluctant to accrue debt, so they opened a direct line of credit with a silent partner, prominent Chicago physician Dr. William Allen Pusey, which allowed the company to remain focused on architecture. See: Owings, *The Spaces in Between: An Architect’s Journey*, p. 69-70.

[73] “Profile: Daniel, Mann, Johnson and Mendenhall: A Summation of Parts,” p. 74.

between the manual labor of architectural drawing and the firm's profit, an incessant culture of equivalence persisted between each of the domains of practice in terms of the value they added to the firm, since the economic rewards of an architect's drawing labor were often not directly evident nor immediate. By the 1970s, the company surged to 700 employees, the number of the firm's services increased from six in the 1960s to twenty-two, and DMJM began to define itself as a "Planning, Architecture, Engineering, Systems, and Economics" firm.[74] Despite drastic reductions in the profit of many architecture and engineering practices as a result of a slowing economy during the recession of 1973, DMJM recorded gross revenue and profit at an all-time high.

While the numerous revisions to the firm's organization charts were widely published in architecture and engineering journals, the company's internal organizational "concept" was not publicized and it was only circulated internally. In striking contrast to the vertically organized business charts, the organizational concept described the firm's ethos as one that was not at all based on a vertical system of hierarchy and command; instead, a "circular diagram," first developed in 1968 and modified and updated thereafter, was deemed most fitting for the firm's culture and growth plans.[75] A radial distribution of employees promoted a greater expansion of services and better reflected a non-vertical hierarchical structure that the architects and engineers

[74] The professional service fields included: Educational Facilities, Institutional Facilities, Medical Care Facilities, Commercial Facilities, Residential Facilities, Industrial and Aerospace Facilities, Defense Facilities, Urban and Regional Sciences, Planning, Economics, Land Development Services, Systems Analysis and Engineering, Transportation, Traffic Engineering, Mass Transit, Highways Bridges and Tunnels, Airports, Harbors and marine Facilities, Environmental Engineering, Public Works Management, Power, and Construction Management. *1966-1975 Daniel, Mann, Johnson, & Mendenhall*, n.d. AECOM archives, Los Angeles, CA.

[75] The growth plan for the firm defined a goal of increasing firm revenue and employee size by 15 to 20 percent per year. "DMJM Basic Organization," *Standard Practices Manual,* Sep 1, 1969, pp.1-2. Stanley A. Moe papers, Huntington Library, San Marino, CA.

had espoused for years. Beyond the diagram's ability to de-emphasize a top-down approach to management, the circular diagram also implied a spatial, centripetal arrangement with a clearly defined center, which added inherent emphasis on the inside and the "periphery" of the firm. "The radial arrangement," the manual described, ensured that "no such organizational unit is further removed from central Company management than any other."[76] Yet this form of diagram also suggested that those in the center, including the corporate Board of Directors, were the furthest from the outer edge and were therefore in the most secure of positions, while those closer to the circle's edge, appeared less protected. This new arrangement was intended to help stimulate growth beyond architecture, as well as to provide an "appealing and workable framework for integration of [*sic*] other highly professional firms which wish to merge their interests with DMJM."[77] The coupling of the subsidiaries with a centripetal organizational culture at DMJM corresponded to a broader shift in the nature of capital accumulation during the 1970s. Circular organizational concepts, with their core group of workers in the center, and with affiliates, associates, sub-contractors at the edge, were specifically used to illustrate the "flexible" means of accumulation under post-Fordism as described by David Harvey. In *The Condition of Postmodernity,* Harvey included a similar circular diagram, titled "Flexible Patterns of Work," which included an outer-most ring of "self-employment," "sub-contracting," "increased outsourcing," and "agency temporaries," that was entirely detached from the inner core (*Figure 2.28*).[78] It was precisely these conditions that would soon come to typify

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[76] Ibid.

[77] "DMJM Basic Organization," *Standard Practices Manual,* Sep 1, 1969, pp.1-2. Stanley A. Moe papers, Huntington Library, San Marino, CA.

[78] David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Oxford and Cambridge, MA: Blackwell, 1989), p. 151.

conglomerate practices, as political geographer Edward Soja argued, since production processes were fragmented in ways that sharply contrasted those that were well integrated and unified under a Fordist economy. Indeed, Soja defined conglomerate practices as those that first began by subcontracting between firms, engaging in joint-ventures, and forming holding companies that helped to expand work outward and beyond the bounds of traditional firms and ownership structures.[79]

By the mid-1970s, DMJM represented a corporate model of profitability that was attractive to a number of local companies, precisely because it had figured out how to absorb and manage what many within the office referred to as the hyper-individualistic architect. As one business leader described, accounting and law firms in Southern California began to study DMJM, viewing it as a model for their own practices because their growth, too, was restrained by unrelenting individuality.[80] In 1974, Albert Dorman was named President and Chief Operating Officer of DMJM, while Mendenhall was named Chairman of the Board and Chief Executive Officer. Dorman would ultimately move into Mendenhall's position as CEO of the firm three years later, when Mendenhall assumed the position as President of the American Society of Civil Engineers. Dorman's rise marked a pivotal turn for the firm, since it represented a complete transfer of leadership to a second generation that was no longer tied to the names of the founding partners; the rise of both Dorman and Mendenhall was celebrated and recognized

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[79] Edward W. Soja, *Postmodern Geographies: The Reassertion of Space in Critical Social Theory* (London; New York: Verso, 1989), p. 185.

[80] Gutman, *Architectural Practice: A Critical View*, p. 123. The prominent accounting firm Arthur Young & Company, for example, credited DMJM for having a superior management structure than many large industrial organizations. Many leading law offices in Los Angeles also began to replicate the management structure of DMJM as a model for engaging with similar practitioner-types that were historically individualistic. Former business executive in discussion with the author, April 27, 2016.

by the engineering community, as a 1975 issue of *Engineering News-Record* featured them on the cover (*Figure 2.29*).

While Dorman was President and Mendenhall was CEO, a series of additions were made to the *Standard Practices Manual* that further described the role and value of subsidiaries, as well as a new and explicit emphasis on profit. The additions included a detailed description of the firm's "Corporate Objectives," written in January of 1974. The objectives described the firm's long-term financial, professional, and social goals, and they were broken down into six primary categories that emphasized growth, expansion, profit, and firm acquisitions. The first was "Personnel and Career Development," which described the atmosphere and culture of the practice as one based on mutual trust between practitioners, open communication, incentives for development, as well as equal opportunities for all employees regardless of "race, color, creed, religion, national origin, or sex." The second was "Growth in Professional Services," which set specific markers for revenue and profit, including an increase of gross revenue at a minimum rate of 12% per year, specifically through "internal growth, subsidiaries, and acquisitions." It also set an ideal profit margin at a minimum of 10% on net services, as well as a minimum return of 12% on private stockholders' equity. Third, the "Technical and Professional Activities" described ways in which DMJM should strive to elevate the quality and techniques of work, and to increase the firm's capabilities in all fields in which the firm already practices, but also to "develop new professional fields where practicable." Fourth, "Geographical Expansion" described the ways in which the firm should seek to derive a larger portion of income from outside of Southern California, especially including in international markets, and a fifth objective, "Expanded Activities," outlined an "overall" goal to "merge with and/or acquire [additional] professional service firms." This point encouraged an expansion of the office into closely related markets through the acquiring of subsidiary businesses that offered "paraprofessional services," and it particularly emphasized real estate development and technology services. The documents noted that while the "main Company interests lie in fields closely related to professional practice, [one should] consider profitable business opportunities outside of professional service fields, but related to the Company and compatible therewith." And finally, a sixth objective, "Ownership," stated that the firm's base should be broadened by making stock ownership available to employees, and, if the appropriate economic conditions were to arise, to convert to public ownership.[81]

The emphasis of DMJM's corporate objectives on profit, growth, and the expansion of the firm through mergers and acquisitions not only reflected a broader shift in the nature of capital accumulation, but also the composition of other large architecture and engineering firms in the US. By the mid-1970s, there were several architecture and engineering firms, in addition to DMJM, that included affiliated or subsidiary firms, and they were recorded within listings in *Engineering News-Record* as "profitable sidelines." Firms ranked at the top of the revenue-based listings were increasingly defined as firms with multiple firms within them, and they included subsidiaries that allowed them to bridge between planning, engineering, and architecture. Throughout the 1970s, subsidiaries were few in architecture and engineering, and they could be listed as footnotes in annual *ENR* listings (*Figure 2.30*). By the 1980s, however, several pages of appendices were dedicated to "designer affiliates and subsidiaries," with firms ranked above

[81] "Corporate Objectives," *Standard Practices Manual,* January 7, 1974, pp. 1-3. Stanley A. Moe papers, Huntington Library, San Marino, CA.

DMJM—such as the Planning Research Corporation—only years away from becoming part of the firm's own consortium (*Figure 2.31*).[82]

Subsidiaries and Affiliated Friends

DMJM's subsidiary organizations were either international offices that were imagined as strategic geographic partners, between which certificates of "affiliate friendships" were exchanged, or they were local organizations owned or invested in by a DMJM partner. However, most business leaders and managers at DMJM lacked the desire and ability to merge with and acquire firms as rapidly or effectively as many engineering firms, since acquiring new companies also demanded a careful reconciling of work cultures. At DMJM, efforts to maintain the identity and cultural integrity of each company as they were acquired were paramount, while other architecture and engineering firms acquiring firms were often less sensitive. At Caudill Rowlett Scott in Texas, for example, the process of acquiring smaller companies was sometimes described as "cultural genocide," in which they would "kill" an acquired firm, such as a small Texas firm, Geren Associates—meaning that the acquired firm's historical approaches to practice, as well as the types of projects in which they specialized, were completely flattened through the process of acquisition.[83] In contrast, an article in a 1970s DMJM newsletter

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[82] DMJM was ranked thirteenth by revenue in 1982 among all architecture, engineering, and planning firms. The top firms were "Engineering-Architecture" firms, respectively listed as The Resource Sciences Corp, Sargent & Lundy, and Biggs & Hill, Inc. DMJM was the largest Architecture-Engineering firm, followed by the CRS Group, Inc. "The Top 500 Design Firms," (May 1982).

[83] King and Langdon, *The CRS Team and the Business of Architecture*, p. 209.

described “how to be an affiliate friend,” which included thoughts and examples about how to reconcile but celebrate differences—geographically and professionally (*Figure 2.32*).[84]

At DMJM, it was not until engineer-cum-businessman Richard Newman was hired in 1977 that the firm intensified its mergers and acquisitions (see *Table 1.0*). Prior to DMJM, Newman served as President of the Engineering and Architecture firm Genge, which was one of the earliest architecture and engineering companies to be publicly listed on the stock market, and which grew by acquiring other companies. At Genge, Newman had become known for aggressively focusing on the merging and acquiring of engineering firms to establish a national network of subsidiaries, which *Engineering News-Record* described in 1973 as a “stable of firms,” with Newman featured on the cover of the magazine (*Figure 2.33*).[85] Indeed, much like a “stable,” the analogy provided by the editors of *ENR* suggested that firms—like animals—were free to enter or exit (invest or divest), depending on the demands of the economy. At DMJM, Newman worked as deputy CEO under Dorman, where he provided complementary business insights to Dorman’s esteemed managerial approaches and ideas about corporate egalitarianism. Though architecture and engineering firms were far less active in merging and acquiring than other, high-technology, industrial organizations, DMJM’s acquisitions during the 1970s were few and relatively small in size, and the number of architectural and engineering firms remained well-balanced. They began to increase in quantity and in size beginning in 1981—each time coinciding with an economic downturn, when the price tag of struggling firms was lowest.

In DMJM’s *Standard Practices Manual*, an extended financial section was added to the

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[84] DMJM, *DMJM Personnel*, 1970, p. 2. CSU Dominguez Hills Special Collections, Dominguez Hills, CA.

[85] “Genge Unites 20 Subsidiaries into a National Design Network,” *Engineering News-Record* (December 1973), p. 23–24.

manual to define a subsidiary in 1974, as well as how one should be procured and managed. The terms "subsidiary" and "affiliate" were collectively referred to as "Subs"—an abbreviation that applied to any corporation or partnership over which DMJM had a controlling interest of twenty percent or greater. New "Subs" could also be proposed at any time.[86] Yet as one architect described, the strategy for acquiring and merging with firms was based on an interest in reaching beneath other firms and geographies:

> While this was much later, there were a couple acquisitions we did that really spoke to our strategy early on. There was a niche Chicago company that did foundation design for large state-of-the-art building towers like the Sears Tower. They were working with all of the big firms, like KPF and SOM and Foster…The idea was that all of them [firms] would have to use our services… It seemed to me that we were always trying to get beneath everyone else in one way or another with our M&As [mergers and acquisitions].[87]

Acquired companies were, therefore, both geographically as well as functionally important to the firm, and they ranged from Hilton Engineers of Portland, Oregon in 1974, which resulted in the formation DMJM-Hilton, to architectural and engineering firm Curtis and Davis in 1976, which importantly added architect Arthur Q. Davis to the firm and helped DMJM to establish a strong architectural presence in New Orleans. Other "Subs" were also established by architects already at DMJM, which provided the firm with services that were far-ranging.[88] Real Estate Technology, Inc. (Realtech), for example, was a subsidiary of the company Real Estate Resources that DMJM Vice President Tef Kutay co-owned, which provided DMJM with an

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[86] "Annual Reports and Plans of Subsidiaries and Affiliates," *Standard Practices Manual,* 17, Dec 1974, pp. 1-3. Stanley A. Moe papers, Huntington Library, San Marino, CA.

[87] Former architect in discussion with the author, Feb 17, 2016.

[88] For the Hilton acquisition, see: "Daniel, Mann in Northwest Joins Hilton," *Los Angeles Times*, May 12, 1974, p. G7. For the acquisition of others, see: Pastier, "Architecture for Big Business Has Become Big Business," p. C7.

effective ownership of thirty-two percent.[89] Realtech initially formed as a joint operation with one of DMJM's clients, prominent Los Angeles real estate developer David Wilstein, which spun into one of the largest real estate development companies in Los Angeles. During the 1970s, Realtech served as a crucial vehicle for commercial investment for DMJM, since it could take greater financial risks in land acquisitions to quickly turn over into equity, permitting DMJM to provide comprehensive developer services to its clients. A built illustration of their working relationship was a DMJM and Realtech collaboration in 1971, when Realtech acquired the land to develop a new corporate headquarter building for DMJM in Los Angeles, which represented the fourth move by DMJM in the city; however, with this relocation, the office building conformed directly to the culture of the practice. The 22-story building was constructed on Wilshire Boulevard and was named One Park Plaza, and it was jointly owned by DMJM and Real Estate Resources (*Figure 2.34*). Designed by DMJM architect Anthony Lumsden, the office spaces designated for DMJM were intended to both conform to and support the firm's continued growth. The floor plan of DMJM's office was entirely open to prioritize horizontality over verticality, and co-dependent groups were located on the fourth floor, which was referred to as the main "production" area (*Figure 2.35*). The design area was centered within a sea of departments, with engineering and production radiating outward.[90] Like in the organizational charts, however, the design area was differentiated from the architecture area, however, where most drawing production and drafting was done. The corporate offices, accounting, personnel, contracts, communications, and administrative offices were on the lofted fifth floor, and so while

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[89] "Profile: Daniel, Mann, Johnson and Mendenhall: A Summation of Parts," p. 74.

[90] DMJM, "One Park Plaza," *DMJM Review* (Spring 1973), p. 1.

the firm described a culture of equivalency and centripetal organization, the office still revealed a latent top-down hierarchy.

Another important subsidiary company was Logicomp, founded in 1971 by founding architect Phillip Daniel, which was an affiliated data processing and computer service firm introduced initially for the US Army Corps of Engineers research laboratory. Logicomp was formally acquired as a full subsidiary of DMJM's in 1975 (*Figure 2.36*).[91] The company provided and maintained all computer and communication equipment and services for DMJM as well as other independent companies, based on Daniel's speculation that "computer aided engineering and architectural design" and "automation" would be the way forward.[92] Logicomp installed and maintained a Univac 9300 Data Communication System for data computation at DMJM, including a Univac 1108S that provided the "pulse" to the computation process (*Figure 2.37*). The Univac computer system was primarily operated by women as part of secretarial work, which was still independent of drawing or business work. Beyond secretarial work, however, more women were hired as architects by DMJM throughout the 1970s, though very few made their way to the ranks of administration, which reinforced and maintained the gendered division of work displayed at Booz Allen Hamilton, where the women were still primarily responsible for efficiency and order, while the men were responsible for making the firm's decisions. Beyond Logicomp, additional subsidiaries during the 1970s including a space planning and interior design affiliate company, Associated Design, Planning and Art (ADPA), as well as a loosely defined company, Atadeco, which was initially established as a shell within

[91] "Data Processing Firm Acquired," *Los Angeles Times*, September 21, 1975.

[92] Paul Konkel, "Getting in Step with CAEDS," *DMJM Review*, (1978), p. 3. CSU Dominguez Hills Special Collection, Dominguez Hills, CA.

which architects and planners first worked on aerial surveillance projects for the government with DMJM's own company airplane, and later it was used for construction contract management. Finally, DMJM's Economics Department operated independently, which conducted financial analyses for a range of development projects, including office buildings, condominiums, apartments, and marinas.

By the end of the 1970s, the term "conglomeration" was used to describe the firm multi-firm structure. "This professional conglomeration," DMJM's Vice President and Manager of the Architecture and Engineering Division argued, "is called a 'multidisciplinary team'—and DMJM was one of the very first firms in the post-World War II era to assemble such an organization."[93] Indeed, by the end of the decade, DMJM had become a corporate conglomerate, including a package of geographically diverse firms and multidisciplinary services, with fourteen listed subsidiaries in *Engineering News-Record* that ranged in service from real estate to management to construction supervision to cosmic X-rays to computer data processing.[94] While many industrial organizations phased out of conglomerate practice by the end of the 1970s, architecture firms, including DMJM, sustained these practices, continuing to acquire additional firms well into the twenty-first century, though under radically different conditions and new corporate identities, which are discussed at the end of this chapter (*Table 1.0*). As a testament to the growing complexity of the firm's structure, many draftspersons, architects, and business leaders

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[93] W. B. Smith, "DMJM in Architecture," *DMJM Review*, September 1976, n.p.

[94] DMJM's listed subsidiaries in 1980 included: American Science & Engineering, Co.; Arctic Slope Technical Services, Inc.; Associated Design Planning & Art, Inc; DMJM International; DMJM/Thomson Ltd; Development and Technology Consultants, Inc., Philippines; Logicomp, Corp; Real Estate Resources; Technical Management Services, Inc.; TMSI Arabia, Ltd, Saudi Arabia; TMSI Contractors, Inc.; Wilhamp, Inc, "The Top 500 Design Firms," (May 1982), p. 95.

were often confronted by multiple identities in practice—sometimes with several simultaneous job titles within different firms. Business cards, as one architect, William Coburn, argued, were the primary tools with which one could reconcile their work history and the overlapping—and sometimes conflicting—personas. Coburn's series of cards helped him to document his own work at DMJM from 1956 to 1995, chronologically revealing the simultaneity of work across several registers that had become the norm of conglomerate architecture practice (*Figure 2.38*).

The Urban Shape of Practice

While the term "subsidiary" was used to describe the firms that lay beneath DMJM's corporate umbrella, the term was also used in the office as a means by which to describe the practitioners as they were viewed as relative to one another in terms of power, which again seemed to contradict the rhetoric of egalitarianism, but it also revealed how the organization of practitioners and their corresponding professions could be viewed in parallel with the structures of urban economies. For instance, as one business leader articulated his own entry into and climb up the corporate ladder of DMJM, he used the term "subsidiary" to describe the structures of successive power linked to each position. Explaining why he was a good fit for DMJM in the 1960s and 1970s, he explained:

> I had the benefit of something no one at DMJM ever had. I had done architecture, engineering, marketing, financing, planning, and built a firm, and I had not been categorized on the architectural side nor the engineering side...I started as a structural engineer, and was subsidiary to the architect, so I thought I better become an architect. Then I thought architects were subsidiary to owners [of properties and buildings], so, I became an owner. Then, I realized that owners were subsidiary to financial institutions, and the only way to get something built was if someone was willing to finance it. So I started a Savings and Loan [company]. My history is one of always expanding. Mechanical, civil, structural, architecture, ownership, finance, and then community

shaping policy.[95]

However, within this engineer-cum-architect-cum-business executive's description of his successive roles was a latent hierarchy of work based on scales of practice that could be understood in relationship to an urban economy: material expertise and engineering were at the bottom, while urban policy-making was at the top. Indeed, while the small, architect-only partnership of DM&J of 1946 was hardly recognizable by the 1980s, DMJM CEO Albert Dorman argued that the emphasis after the 1970s would be not on the narrowly-focused designing of buildings nor on the identification of specific building types, but rather on

> the total social and environmental context of the project. The individual building will be viewed from this perspective. Since social and environmental issues are very complex, it will take complex interdisciplinary teams to approach them. Therefore, the firms of the future will be very large (by today's standards) to include the variety of disciplines required; or alternatively, will be quite small functioning as essentially specialty firms. The mid-sized firm will have difficulty in surviving. Or, to use a homely example, the VW and Cadillac will each command a strong market, but the DeSoto may not have a place. [96]

By emphasizing the context of a building, rather than the building itself, Dorman shifted the agency of the architect and engineer from the drawings they produce to the firm itself. During his brief tenure as Design Director at DMJM, from 1964 to 1968, Cesar Pelli similarly argued that "as architects and planners, we must now answer the basic needs for richness and fullness in the total of our experiences. And we can do it because we have the 'elements.'"[97] In a revealing comparison, Nathaniel Owings of SOM also described the architect's role in designing the broader environment, though for him, agency was assigned to buildings. While Dorman and

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[95] Former business executive in discussion with the author, February 8, 2016.

[96] "Profile: Daniel, Mann, Johnson and Mendenhall: A Summation of Parts," p. 78.

[97] Cesar Pelli, in "The Shaped Objects of Design," *DMJM News*, no. 2 (1964), p. 1.

Pelli's attention to the social and environmental *context* of a building implied that it was in the very breadth of services offered by the firm—and its subsidiaries—where their agency was located, Owings argued that it was the volume of buildings, rather than their contexts, which could affect a person's environment: "We were after leverage to *influence* social and environmental conditions."[98] Yet the difference between *context* and influence may be best described in terms of control, order, and power. As one business leader described, the aim of DMJM was not wed strictly to designing buildings nor even to a particular building type:

> We were not going be a school firm like Perkins and Will. We were not going to be a high-rise firm like SOM. *We were going to be everywhere.* Because my own observation was that things went up and down due to funding. The Northeast [United States] might be dead, and the Southwest might be booming; schools [buildings] might be the biggest thing in the world, and then highways might be booming. It would cost us money. When a discipline or a region went down, we would pay a price for it. But overall, we would be steady.[99]

By the 1970s, the diversity in projects and geography had become entrenched as a DMJM doctrine: "good fortune largely results from the diversity, both in practice and in geography, which has always been a hallmark of our firm."[100] The diversity in both services and geography made possible by DMJM's structure was defined not as a form of influence, but instead as a form of "geopolitical power," which was a phrase used to describe the kind of power that helped the firm to maintain socio-economic stability, win increasingly large commissions, and to interest firms in acquisitions or mergers.[101] As one architect described:

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[98] Emphasis added. Owings quoted in Boyle, "Architectural Practice in America, 1865-1965--Ideal and Reality," p. 325.

[99] Emphasis added. Former business executive in discussion with the author, February 8, 2016.

[100] Dick Turpin, "Albert. A. Dorman Named President of DMJM Firm: DMJM," *Los Angeles Times*, December 22, 1974.

[101] Former architect in discussion with the author, April 18, 2016.

> If they [the executives] wanted to permanently get into an area or market, they would acquire a firm that was dominant in their particular region or city. In the earlier years, each one [acquisition] was a small firm. When we grew, so did the acquisitions.[102]

While "geo" referred to the geographic breadth of the firm, as it expanded primarily by the opening and acquiring new offices in cities from New Orleans to London to Tokyo, the explicit diversity of services constituted the "political" dimension of the firm.

Vice President of DMJM, Tef Kutay, argued that the firm's broad structure and its range of subsidiaries allowed architects to approach architectural projects through the work of "total design."[103] Unlike the late nineteenth-century framework of a "Total Work of Art," or Walter Gropius's concept of "Total Architecture," which called on the architect to embrace—rather than resist—the predominant means of production in order to produce everyday modernist objects and buildings, Kutay argued that "total design" implied a scalar succession of building from material to city: "total architecture" began with "the bare land or empty space and move[s] step by step toward the goal of an environment for man's use and enjoyment."[104] Even further, the synchronicity between the shape and composition of DMJM's practice and the city was made

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[102] Ibid.

[103] Bruno Latour and anthropologist Albena Yaneva have similarly reframed the architectural "project" as one that accounts for a wider range of socio-material and temporal potentialities of architectural work—the accumulation, modifications, and adaptations of information before, during, and after a building is constructed—that challenge the constructed 'building' as the sole source of an architect's affective power. "Design Director Named by Architectural Firm," *Los Angeles Times*, August 30, 1964.

[104] Tef Kutay, in "Design Director Named by Architectural Firm," p. L11. In contrast, Gropius suggested that architects could produce object forms that derive from the total "scope" of technical, economic, and social conditions. See: Walter Gropius, *Scope of Total Architecture [1943]* (New York, NY: Collier Books, 1962). The phrase "total environment" was similarly used by other large and bourgeoning Los Angeles-based architecture firms, such as by Welton Becket, for whom the philosophy of "Total Design" implied not only architecture, engineering, and construction management, but also master planning and space planning both for buildings and their surroundings. William Dudley Hunt Jr., *Total Design: Architecture of Welton Becket and Associates* (New York: McGraw-Hill, 1972), p. 4. In 1987, Welton Becket and Associates was acquired by Ellerbe Associates, which operated as Ellerbe Becket and was acquired by AECOM in 2009.

patently clear in a diagram for an experimental city developed by DMJM planners and architects. Drawn as a circular "urban system" that almost directly echoed the spirit of DMJM's organization, the hypothetical city was comprised of twelve "subsystems," each of which was outlined as a bounded component that neither touched nor overlapped others (*Figure 2.39*). Like the services offered by DMJM, the "urban system" was comprised of social, economic, political, and physical subsystems. Architecture was designated as only part of the "physical" attributes of the city—not at all touching the political or economic components—and as a direct opposite to non-material social and cultural subsystems. However, when taking into account the wider range of *practices* and the scope of work in which architects were actively engaged, through subsidiaries and affiliated companies, the field of architecture was much wider. Beyond merely the "City Form and Building" subsystem, DMJM's practices—from real estate to computer services to economic consulting—exemplified the economic, socio-cultural, and political dimensions of their imagined urban economy, as well.

Therefore, the slow process of designing a responsive architectural practice through corporate conglomeration resulted in a precise attunement to the process of urbanization. This relationship—between late capital accumulation and the imposing of order by architects on the entire urban economies—was described by David Harvey as a result of post-Fordism and the accumulation of profit.[105] While the history of capitalism has largely followed the history of urban development, from the rise of the mercantilist city, to the industrial city, to the Keynesian

[105] David Harvey, *The Urban Experience* (Baltimore: Johns Hopkins University Press, 1989), p. 22. Also see: David Harvey, "From Managerialism to Entrepreneurialism: The Transformation in Urban Governance in Late Capitalism," *Geografiska Annaler B: Human Geography* 71, no. 1 (1989), pp. 3–17; David Harvey, *The Urbanization of Capital: Studies in the History and Theory of Capitalist Urbanization* (Baltimore, Md: John Hopkins University Press, 1985); Jason R. Hackworth, *The Neoliberal City: Governance, Ideology, and Development in American Urbanism* (Ithaca: Cornell University Press, 2007).

city, Harvey suggested that postwar urbanization presented a spatiotemporal solution to the crisis of overaccumulation or surplus. However, the presence of surplus, according to Harvey, also risked overaccumulation, which posed a potential contradiction to capitalist accumulation, since it could result in excess commodities, falling rates of profit, or idle money capital. To avert and to delay such a crisis, he argued, one could invest in the process of urbanization itself: "It is through urbanization," Harvey argued, "that the surpluses are mobilized, produced, absorbed, and appropriated."[106] Therefore, while DMJM itself was not directly investing in the built environment, the allocation of their profits into the development and acquisition of new firms in tune with the shifting demands of urbanization enabled architecture practice to not only take the shape of entire urban economies, but also to allow a single conglomerate firm, such as DMJM, to produce and maintain them.

The Formation of AECOM

Although one could argue that the architects at DMJM undermined or helped to expunge the historical role of the architect, this chapter argues that DMJM expanded the field of practice upon which architects could operate—as social and economic equals—among a broader range of urban practitioners. While conglomerate activity during the 1960s and 1970s was the primary domain of industrial manufacturing and high technology enterprises, conglomeration expanded to oil companies by the 1980s, which attempted to diversify due to unstable oil markets in the Middle East, as well as to evade anti-monopoly efforts from the US Department of Justice. Due to its experience managing a wide spectrum of architectural and engineering services, DMJM

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[106] Harvey, *The Urban Experience*, p. 54. Harvey specifically situates the postmodern turn of 1972 in architecture as "nothing more than the cultural clothing of flexible accumulation." See: David Harvey, "Flexible Accumulation Through Urbanization: Reflection on 'Post-Modernism' in the American City," *Perspecta* 26 (1990), pp. 251–72.

was acquired in 1984 by a Kentucky-based oil company, Ashland Oil Inc., which was a large, diversified corporation with operations ranging from petroleum to insurance, and the parent corporation of Valvoline Oil (*Figure 2.40-2.41*). Ashland's Chief Operating Officer, John Hall, announced a desire to shift away from strict oil refinery and gasoline, toward "high-technology" products and services. He noted that "back in the 1960s, our chief strategy was to push more oil through the refineries, make more gasoline, sell more gasoline…It doesn't work like that anymore. The world has changed. You've got to have a different *twist*."[107] Unlike oil giants, such as Exxon or Gulf, Ashland was required to think more broadly to maintain economic stability. To do so, the company drastically reduced its petroleum efforts—quite significantly—to 35-40 percent of its total revenue, and it sought earnings from related, non-refining businesses.[108] Ashland formed both a chemical division as well as an engineering and construction division rather fortuitously—not because the company thought that architecture and engineering would be lucrative ventures, but because it had acquired firms in which architecture and engineering practices were already active, including Holmes & Narver, Inc. and Williams Brothers Engineering. Ambitious in their venturing into architecture and engineering without any prior experience in either field, Ashland acquired DMJM so that its corporate leadership could manage the architecture and engineering companies, and they formed Ashland Technology Corporation in 1985, which was a subsidiary wholly owned by Ashland Oil, Inc. At the time of the

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[107] Emphasis added. "Company News: Ashland's Future May Not Be in Oil: Competitive Edge Sought in Diversity," *New York Times*, December 1, 1980, D4.

[108] In 1984, Ashland noted that it would be a difficult year for petroleum refining operations, since OPEC struggled to maintain its price structure with diminishing demand. Progress was noted in four new growth areas for the company: chemical distribution, specialty chemicals, domestic oil and gas exploration, and engineering services. Ashland Oil Company, *Annual Report* (Ashland, KY: Ashland Oil Company, 1990), p. 4-5.

acquisition, Albert Dorman was CEO and Chairman of the Board of DMJM, and Richard Newman was the company's President; Dorman was hired to take the reins of the new holding company, which was initially comprised of three architecture and engineering firms and their respective subsidiaries: DMJM; Holmes & Narver, Inc.; and Williams Brothers Engineering.[109] While Ashland Oil provided managerial autonomy to the new holding company, it encouraged each of the firms, including DMJM, to directly compete with each other—often for the same projects—to help sharpen their own identity and to increase the chances that at least one company might win a commission.[110] In DMJM's 1985 Annual Report, both Newman and Dorman described both "change" and "continuity" during the first year as part of the new "Ashland family," noting that Ashland provided DMJM new capabilities as a Fortune 500 company, including financial, management, and technical resources that were otherwise not available to an architecture firm.[111]

This kind of merging and acquiring activity was not exclusive to DMJM: in 1985 Perkins & Will was acquired by a Lebanese engineering firm Dar Al-Handasah in order to form a consortium of architecture, engineering, and management partners, named the Dar Group.[112] While Perkins & Will maintained this relationship, Ashland Oil quickly dipped into and out of

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[109] Ashland Oil Company, *Annual Report* (Ashland, KY: Ashland Oil Company, 1986), p. 29-30.

[110] This added layer of competition was also matched by an expectation that the "family" of firms would rely on each other for services as well. For DMJM, which had developed its own working relationships and included its own engineers, this often meant that they were required to work with engineers or other designers that, in the eyes of those at DMJM, would not otherwise have been their "first choice." Former architect in discussion with author, Los Angeles, CA, September 2, 2015.

[111] DMJM, *Annual Professional Review* (Los Angeles, CA, 1985).

[112] "Dar Group Factsheet." Also see: Lawrence Bradford Perkins, Oral history of Lawrence Bradford Perkins, F.A.I.A., interview by Betty J. Blum, 2000, Department of Architecture, the Art Institute of Chicago, p. 154-55.

the engineering and construction industry after its finances strengthened by 1989, though it implanted an emergentist desire within DMJM—a thirst for more subsidiaries, greater geographic breadth, and for more "affiliate friends." By 1990, Ashland withdrew from the engineering business, selling a majority interest in Ashland Technology, and Richard Newman initiated a three-million-dollar Employee Stock Ownership Plan (an employee-led buyback) in April of 1990, which resulted in the formation of an employee-owned multinational architecture and engineering firm, named AECOM Technology Corporation. AECOM maintained the acronyms "ATC" on the stock market as had been established by Ashland Technology Corporation, and it consisted of five "legacy" companies that were acquired during the five years of Ashland's holding: DMJM; Consoer, Townsend & Associates, Inc.; Frederic R. Harris, Inc.; Holmes & Narver, Inc.; and P&D Technologies, Inc.

While DMJM represented only one part of this new conglomerate of firms, its culture of practice was maintained and reinforced in the formation and oversight of AECOM, since Dorman was named as AECOM's first Chairman of the Board and Chief Executive Officer, and Richard Newman was its President.[113] Like DMJM's corporate objectives, established in 1974, AECOM's first annual report included "Corporate Objectives," which were outlined by Dorman and Newman, that included six potential areas of long-term professional, financial, and social goals that echoed DMJM's. The objectives included an emphasis on the quality of work,

[113] DMJM maintained semi-autonomy as a subsidiary within AECOM until 2007, when AECOM was publicly listed on the New York Stock Exchange, though it merged with and was reconfigured numerous times. In 2000, for example the firms Frederic R Harris and DMJM merged to create "DMJM Harris," to focus on "infrastructure and transportation business segments"; and Holmes and Narver Inc. merged with DMJM to form "DMJM H&N" to focus on "facilities business segments." In 2003, DMJM H&N was reorganized again into DMJM Design, DMJM Management, and DMJM Technology. Jeffrey L. Rodengen, Elizabeth Fernandez, and Heather Lewin, eds., *AECOM: 20 Years and Counting* (Fort Lauderdale: Write Stuff Enterprises, Inc., 2010), p. 38-40.

professional standards, public reputation, and development of both individual employees and the firm.[114] However, the rhetoric of "growth" and "expansion" pervaded the objectives, as they did at DMJM, including an emphasis on change, adaptation, and an open-ended approach to practice. One of the six corporate objectives was "Growth in Services," which outlined the ways in which Dorman and Newman hoped to achieve 100% employee ownership, maintain strong profit margins, and plan for a "self-renewing" firm; a second was "Geographical Expansion," which described an effort to continue to diversify the corporation geographically (nationally and internationally) so that the firm was not wholly dependent upon any single region; and a third objective was "Expanded Activities"—the same phrase used by DMJM in the 1970s—that explicitly defined the firm's goals to expand the technical, operational, maintenance, and managerial services of the firm and to "merge into AECOM other related firms that would expand AECOM's range of services or geographical coverage."[115]

In a metaphoric nod to the thousands of employees that AECOM purported to unite under a new corporate identity, the annual report was sandwiched by pages of the individual names of thousands of "employee-stockholders," printed across several spreads in tiny font and in alphabetical order, with justified text that conformed to the margins of the page. In their first letter to the shareholders, Newman and Dorman argued that "in a literal as well as figurative sense, its employees *are* AECOM."[116] But the blocks of individual names might be read just like

[114] The six outlined corporate objectives were: Technical and Professional Activities; Personnel and Career Development; Growth in Services; Geographical Expansion; and Expanded Activities and Ownership.

[115] AECOM, *Annual Professional Report* (Los Angeles, CA: AECOM Technology Corporation, 1990), p. 3. W. Coburn Papers, Los Angeles, CA.

[116] Ibid., p. 1.

blocks of materials: embodiments of experience, capital, and labor, which demonstrated to the shareholders a sense of uniform, affective strength (*Figure 2.42*). The firm's new name, A-E-C-O-M, was reduced to its anonymized services, and it was no longer attached to the names of the founding partners. However, the name also provided for future flexibilities and open-ended possibilities. A and E were clear: architecture and engineering; yet the COM was specifically left open-ended, and it was a testament to flexible and open-ended possibilities precipitated by late capitalist economics. It could be used to suggest Construction, Operations, and Management; or, Contracts, Operations, and Maintenance; or, Construction Management.[117]

[117] Former business executive in discussion with the author, February 8, 2016.

CHAPTER 3

Defend and Deter: Architecture and the Military-Industrial-Entertainment Complex

In the preface to his revised book, *Concept of the Corporation* (1972), management consultant Peter Drucker argued that the post-Fordist organizations that had come to typify the late-twentieth-century were no longer comprised of small groups with a single, all-knowing executive at their helm, but instead, thousands of people with "very diverse skills and knowledges" working "jointly" in large and well-managed groups.[1] It was through this new kind of organization, Drucker argued, that workers with specialized knowledge, representing a wide spectrum of disciplines and geographies, could use their profound diversity to transcend the boundaries of disciplines and nations to develop material capacities otherwise unknown to the world, from atomic bombs to ballistic missiles to vaccines. For Frederic Jameson, these new organizations, and the material possibilities they represented, not only typified late capitalism, but also "a whole new wave of American [and thus, global] military and economic domination through the world."[2] For architecture, as for many engineering and high-technology firms, it was through these kinds of imperial projects—unprecedented in their scale and ability to impose order and discipline upon the entire globe—that multinational, multi-firm practices in the United States were rendered necessary and desirable. This chapter reveals how the interest of the founding DMJM partners in joint-ventures, sub-contracts, and ultimately corporate conglomeration was a direct result of the firm's earliest, most formative institutional relationships, including with the US military, CIA, World Bank, World Health Organization, and

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[1] Peter Drucker, *Concept of the Corporation* (New York: The John Day Company, 1972), pp. xvi-xvii.

[2] Frederic Jameson, "Postmodernism, or the Cultural Logic of Late Capitalism," *New Left Review*, no. 146 (July-August 1984), p. 57.

US Agency for International Development during the Cold War. Like the US military, which hoped to impress its capital power upon the world by boasting a robust and impassable armor of material defense, as well as a simultaneously threatening form of ideological deterrence with its arsenal of weapons, conglomeration came to similarly represent both a defensive means by which architects could hedge against the volatility of a postwar economy, as well as an *affective* means by which they could inflate their experiential capacities, deepen their embodied histories, and extend their social and geographical networks in order to win projects that were increasingly larger, global, and disciplinary.

The founding partners of DMJM were educated in Los Angeles during the Great Depression, and they formed their office just as the Golden Era of Hollywood was being overshadowed by the realities of Cold War nuclear threat. DMJM's views about architecture practice were conditioned by the prominence of the aerospace and film industries in Southern California—both of which demanded workers with diverse skills and experiences, including architects, in order to impress their capital power upon the world in material ways. Indeed, the power of both industries relied on architects, and they collectively informed the practices at DMJM. The military's ability to deter nuclear attacks, for example, was predicated on the production of dramatic displays of material and technological force during the Cold War—by testing rockets, missiles, and bombs in discrete chambers and upon launching facilities designed by firms such as DMJM. Not only were these facilities required to defend the US against an impending nuclear attack, but they also demonstrated brute strength and invulnerability in an effort to lull the everyday denizen, as well as potential aggressors, into order and complacency. At the same time, full-scale buildings in Hollywood emerged in studio backlots, and full-scale stage sets were constructed in enclosed studios that were designed by architects and classmates of DMJM's founding partners where filmic realism fed on the insatiable thirst of the masses for entertainment. Architects, therefore, were not only complicit in the production of what Theodor Adorno and Max Horkheimer referred to as the "culture industry," but they were instrumental in the ability of global institutions, from Hollywood to the US military, to identify precise points of hegemonic agreement between the built environment and its affects: between its material capacity to defend and its performative capacities to entertain, deter, or discipline.

Accumulating Experience: "Be in the right place at the right time"

Amid growing speculation that the Soviet Union was installing nuclear-armed missiles in Cuba, draftsman William Coburn sat anxiously at his drafting table in May of 1962 anonymizing a set of construction drawings that he had just completed by erasing the client's name, the building's title, and its location. The drawings detailed a renovation plan for an existing six-story concrete structure, named "Building 213," in the Washington, DC Navy Yard, into which the nation's top photo surveillance program, the CIA's National Photographic Interpretation Center (NPIC), would move in 1963. Originally built in 1944 to store steel blanks for the Navy, the building's renovation required the highest level of government classification, and it subjected architectural work to absolute secrecy.[3] Assigned to a small, undisclosed, government-approved room on a floor above DMJM's main office in Los Angeles, Coburn sat at his drafting table next to an alarmed safe in which he stored the drawings until they were ready to be carried in-hand to meetings in Washington DC. Once in DC, he retreated to an LA-equivalent basement office,

[3] The relocation to Building 213 was due to a growing number of committees and staff that required a larger briefing room for meetings than was offered by the Steuart Building. The scope of the work included the remodeling and conversion of a "warehouse-type space" to "office and laboratory space." See: "Memo for the Record: Remodeling of Building No. 213," March 9, 1961. CIA Special Collections. For an overview of NPIC's history, including the spaces in which they occupied, see: Jack O'Connor, *NPIC: Seeing the Secrets and Growing the Leaders: A Cultural History of the National Photographic Interpretation Center* (Alexandria, VA: Acumensa Solutions, 2015).

where he worked in isolation to add the lettering back onto the drawings in preparation for his meeting. Coburn described his and Phil Daniel's routine entrance to the Steuart Motor Company Building, a seven-story office structure in which a Ford dealership was located in the first three floors and the NPIC was discretely enclosed on the top floors until Building 213 was complete (*Figure 3.0*):

> It was like a scene from a movie…Walking in, you'd see glass windows [of the Steuart Building] with soap on them—nothing really to help identify anything in there. We would walk in through the door and walk down to the elevator. That's where the guard sat. We would check in, and then someone would come down to get us when they were ready. Here we were, designing a new facility for them, but we had to wait while they took blankets and covered over all of the equipment they were using so that we couldn't see it—the same equipment that we had to accommodate in the new building. Talk about overkill!…Then we would go up, be escorted to the conference room, and we would lay out the drawings and go through everything, and usually we were there two to three days at a time…*We never learned much about what they were doing, but we sure gained valuable experience!*[4]

Like both Hollywood and the military, Coburn's sentiments reflected a desire by architects at DMJM to accumulate diverse experiences—by developing or acquiring firms—in order to help the firm guard against economic downturns, as well as to allow the firm to obtain projects that were increasingly larger, infrastructural, and global in scale. This desire to inflate the firm's experiential capacity reflected a fundamental concern of liberal economics. Helping to revive liberal economics during the 1940s, economists and philosophers such as Friedrich Hayek, whose theories shaped the policies of Ronald Reagan and Margaret Thatcher during the 1970s, argued that the sum of a firm's knowledge not only accounted for the kind of knowledge associated with science and expertise, but also the form of knowledge acquired through experiences and inscribed into the very flesh of individuals. This kind of knowledge was described as that which emerged from "the particular circumstances of time and place"—of

[4] Emphasis added. William Coburn in discussion with the author, July 2016.

people, local conditions, and situations—that provided people with unique advantages over others, and which itself constituted a firm's economic offering.[5] This desire to inflate the experiential capacity of DMJM was initially outlined in the 1950s in a two-fold tenet of practice that became deeply entrenched, to 1) acquire as many different "experiences" as possible in order to be able to provide "nothing less than outstanding service to every client on every project" and 2) "be in the right place at the right time."[6]

When the jolt of the Great Depression in the US eclipsed the construction boom during the early 1920s, architects struggled to find work. At educational institutions such as the University of Southern California (USC) in Los Angeles, where both Daniel and Johnson studied during the 1930s, architecture students were explicitly encouraged to imagine the applicability of their skills and the value of their labor to industries and fields beyond architecture. [7] When it formed in 1925, USC was the first formal architecture program in Los Angeles, and its first dean, Arthur C. Weatherhead, was committed to pushing past Beaux-Arts traditions to focus instead on the local contexts in which the school was embedded: on "specific sites," "real problems," and

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[5] Friedrich A. Hayek, "The Use of Knowledge in Society," *American Economic Review*, no. 35 (September 1945): 519–30. Those tracing the history of so-called neo-liberalism, such as geographer David Harvey, have referred to the group of economists known as the Mont Pelerin Society, which included philosopher Friedrich Hayek, Milton Friedman, and Ludwig Von Mises. They attempted to revive a tradition of "classical" liberalism, against regulation and state intervention. Harvey concludes that their arguments became popular in the late twentieth-century, especially among think-tanks and corporate organizations. For a brief overview of these parallels in architecture, see: Keller Easterling, "Coda: Liberal," in *Architecture and Capitalism: 1825 to the Present* (New York, NY: Routledge, 2014), pp. 202–16.

[6] DMJM, *1946-1955 Daniel, Mann, Johnson, & Mendenhall*, p. 9. AECOM company archives, Los Angeles, CA.

[7] Aside from Daniel and Johnson, Arthur Mann studied at the Beaux-Art Institute of Design and the Chouinard Art School in Los Angeles, while Irvan Mendenhall studied civil engineering at the University of California, Berkeley.

"planning principles."[8] Weatherhead argued that "architecture must grow out of the conditions existing in the civilization which it serves and that training for the practice of this architecture must be governed by the same approach."[9] As historian Debra Howell-Ardila has described, in order to maintain "relevancy," architectural pedagogy under Weatherhead was pragmatic and socially responsive to Southern California.[10] Looking out to the city of Los Angeles, Weatherhead suggested that there was a strong "commingling" of workers in many "allied arts" from which architects could gain immense social and economic footing. He specifically called attention to the film industry, and he encouraged architecture students to look beyond the traditional domain of architectural work to consider positions as directors and designers of stage sets.[11] He noted:

> Quite distinct from the regular field of endeavor of the architect and his co-workers are the vast possibilities of the architecture of motion pictures. Without its proper architectural background no motion picture can create in the minds of its audience the

[8] Jocelyn Dian Gibbs, *Outside in: The Architecture of Smith and Williams* (Santa Barbara, CA: Art, Design & Architecture Museum, University of California, Santa Barbara in Association with Getty Publications, 2014), p. 16. Despite the rhetoric of moving beyond a Beaux Arts model, historians have noted that many early architects working within the film industry were still most regarded for their ability to accurately reproduce historical styles. Many of the historical preferences of the architects were later translated into "studio styles." MGM was known for an affinity for the clean lines of modernism, while the Warner Brothers productions reflected European expressionists. See: Beverly Heisner, *Hollywood Art: Art Direction in the Days of the Great Studios* (Jefferson: Mcfarland, 1990), p. 38-39.

[9] Arthur C. Weatherheard, "A Note on Education in Architecture," *The Architect and Engineer,* (December 1935), p. 69.

[10] Deborah Howell-Ardila, "The USC Connection: Origins and Context in the Work of Whitney R. Smith," in *Outside In: The Architecture of Smith and Williams* (Los Angeles, CA: Art, Design & Architecture Museum, University of California, Santa Barbara in Association with Getty Publications, 2014), p. 91. For a comprehensive history of the USC program, see: Deborah Howell-Ardila, "'Writing Our Own Program:' The USC Experiment in Modern Architectural Pedagogy, 1930 to 1960" (Master's Thesis, University of Southern California, 2010).

[11] Jani Scandura, *Down in the Dumps: Place, Modernity, American Depression* (Durham: Duke University Press, 2008). On the history of architects in Hollywood and the design process especially during the golden age, see: Juan Antonio Ramirez, *Architecture for the Screen: A Critical Study of Set Design in Hollywood's Golden Age* (Jefferson and London: McFarland & Co, 2004); Donald Albrecht, "Architecture on Film: Mallet-Stevens to Meerson," *Journal: A Contemporary Art Magazine* 4, no. 38 (1983), pp. 27–30; A. B. Laing, "Designing Motion Picture Sets," *Architectural Record* 74 (July 1933), pp. 59–64; R Mysercough-Walker, "The Art of Making Films. Designing for Moving Pictures by E. Carrick (Review)," *Architectural Review* 89 (January 1941), pp. 141–42; O Blakeston, "The Architect at the Movies," *Architectural Review* 74 (January 1934), p. 21.

> desired atmosphere, or clearly and successfully interpret the historical period it seeks to portray…this entirely new field of architectural endeavor is of particular importance to this community because of its strategic position as the capital of the motion-picture world.[12]

While Weatherhead first emphasized the familiarity of architects with architectural history as an asset to film production, which recalled a long history of architects interested in the representational possibilities of theater design, his second emphasis on the "strategic position" and authority of Hollywood revealed an attunement to local industries in positions of power. Hollywood offered new opportunities for architects during the 1920s and 30s, since full-scale buildings were beginning to rise in studio back-lots and in fully-enclosed sound stages as the ultimate incarnation of so-called "theatrical realism."[13] The designing of stage sets required only minor revisions to the traditional actors of architectural practice: characters in the scripts were the imaginary clients, and architects were valued for their ability to design buildings specifically for the camera (*Figure 3.1*).[14]

At the Warner Brothers studio, architects including Carl Jules Weyl turned to art directing when their architectural practices faltered; Weyl was later recognized for films such as *The Adventures of Robin Hood* (1938) and *Mission to Moscow* (1943).[15] At the MGM studio, art department head Cedric Gibbons—the son and grandson of architects—considered his staff as the studio's "architecture and engineering department," and the vast majority were licensed

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[12] Arthur C. Weatherhead, "Architecture and Life," *Los Angeles Times*, April 22, 1928, p. K12.

[13] Among others, see: Carrie Rickey, "Art Directors: Theatrical Realism" 18, no. 1 (1982), pp. 32–33; Mario Eugenio Beguiristain, *The Actors Studio and Hollywood in the 1950s: A History of Theatrical Realism* (Lewiston, N.Y: Edwin Mellen Press, 2006).

[14] Raymond Mysercough-Walker, "The Art of Making Films," p. 142.

[15] Julie Drapkin Dercle, "Cinema and Architecture: Towards Understanding the Cinematic Sense of Place and Its Relationships to the Built Environment" (Ph.D. Dissertation, University of California, Berkeley, 1992), p. 426.

architects or had at least some form of architectural training.[16] Perhaps unsurprisingly, USC's architecture program emerged as a hatchery for both architects and Hollywood art directors.[17] In a survey conducted of its 123 graduates of architecture in 1939, USC noted that thirteen percent of its former students worked in the film industry, two-thirds as practicing architects, and the remaining worked as contractors, interior designers, or government officials.[18] However, by the time that Phillip Daniel and Kenneth Johnson graduated from USC in 1937, the outlook for architectural work had improved, due in part to New Deal policies and defense-related programs. While both Daniel and Johnson turned directly to architecture practice prior to serving in World War II, several of their closest classmates turned to the film industry, instead (*Figure 3.2*). These classmates included Daniel and Johnson's architecture fraternity-mate Hilyard Brown (1937 grad), known for his work on *Citizen Kane* (1941) and later *Cleopatra* (1963); Henry Bumstead (1937 grad) for *To Kill a Mockingbird* (1962) and *The Sting* (1973); and Jack Martin Smith (1934 grad) for *The Wizard of Oz* (1939), *Cleopatra* (1963), *Fantastic Voyage* (1966), and *Hello, Dolly!* (1969), among many others.[19] Although the work of architects and architect-cum-art

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[16] Ibid., p. 415. Also see: Christina Wilson, "Cedric Gibbons: Architect of Hollywood's Golden Age," in *Architecture and Film*, ed. Mark Lamster (New York, NY: Princeton Architectural Press, 2000), pp. 101–15.

[17] While USC produced the greatest number of art directors and production designers, it would be inaccurate to suggest that all emerged from there. Notable directors graduated from many other institutions as well, including Alexander Golitzen from the University of Wisconsin and Arthur Lonergan from Columbia University.

[18] Howell-Ardila, "'Writing Our Own Program:' The USC Experiment in Modern Architectural Pedagogy, 1930 to 1960," p. 39, 42.

[19] The many other USC-trained film designers included: William Horning (1934 graduate) for *The Wizard of Oz (1939), Gigi* (1958), and *Ben-Hur* (1959); Edward Carfagno (1933 grad) for *The Bad and the Beautiful* (1952), *Julius Caesar* (1953), and *Ben-Hur* (1959); and Boris Leven (1932 grad) for *Alexander's Ragtime Band* (1938) and *West Side Story* (1961). The overlap between architecture and film production has persisted, though less prolifically. Numerous production designers, including Dean Tavoularis for *The Godfather* (1972) and *Apocalypse Now* (1972), and Dante Ferretii for *Shutter Island* (2010) and *Gangs of New York* (2002), were trained as architects. There has been relatively little scholarly attention to the relationship between film practice and architecture practice. For an excellent theoretical and historical overview, see: Drapkin Dercle, "Cinema and Architecture: Towards Understanding the Cinematic Sense of Place and Its Relationships to the Built Environment."

directors appeared to categorically diverge upon graduation, the architects at DMJM would soon reveal how their own designs of Cold War stage sets for the US military—for rocket testing and missile launching—directly paralleled the work of the film industry.

The Military Foundations of DMJM

Daniel, Mann, and Mendenhall served in the military during World War II, during which time they formed close relationships with military officers and commanders—upon which many of DMJM's earliest and formative projects depended. Daniel served as a Radar Officer for the Navy, Mann joined the Army Air Corps, Mendenhall served in the Navy Construction Battalion in the European theatre, and Johnson worked in the Pollock shipyard in Stockton, California as a civilian (*Figure 3.3*). During the 1950s, as school commissions in Los Angeles began to dwindle and proved to be less lucrative than was hoped, only one partner (Arthur Mann) was needed to oversee them. As a result, a "fallback" plan was developed, which encouraged the partners to exploit their existing military relationships to procure military projects that could augment the "architecture practice." Fortunately for DMJM, military friendships from World War II led to significant military work thereafter, which re-defined the firm as a fully international practice by the middle of the 1950s.

Military projects were initially viewed as distinct from architectural projects, and the partners cited the ability of such projects to serve—like the film industry for Weatherhead at USC—as a "hedge against possible softening of the 'boom time' in architecture."[20] While school buildings conformed to the kind of projects that Henry-Russell Hitchcock described in 1947 as

[20] "Daniel, Mann, Johnson & Mendenhall: How Teamwork Has Built a Thriving Architect-Engineer Firm." Stanley A. Moe papers, Huntington Library, San Marino, CA.

those that were produced by large-scale architectural "bureaucracies," including hospitals and factories, most military construction projects, such as military bases and missile chambers, eluded Hitchcock's categories altogether because they were not yet described as architecture, nor even as buildings.[21] For the partners at DMJM, the social relationships with military personnel were described with affective and performative characteristics, akin to "ammunition." As one architect described:

> At first, they [Daniel and Johnson] thought they could survive on only school buildings, but Daniel and Johnson were actually more interested in foundational kinds of projects like the ones that the military had to offer…they were friends with a whole bunch of military commanders that gave them some ammunition and put them on the map.[22]

Rather than specializing in particular types of buildings, the suggestion of "foundational" projects revealed an interest in the groundwork or backdrop—a building's foundation or a military's base—that would enable DMJM to occupy a wider of number of "places" and "times" and thus to inflate its experiential capacity and economic offerings.

Prior to the Brooks Act of 1972, or the "Selection of Architects and Engineers" statute, the criteria for selecting architects and engineers for federal government projects were not required to be publicly announced; selections were determined primarily by price and geographic proximities of a firm, rather than by competency and qualifications.[23] Instead of waiting for

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[21] Henry-Russell Hitchcock, "The Architecture of Bureaucracy and the Architecture of Genius," *Architectural Review*, no. 101 (1947), pp. 3–6.

[22] Emphasis added. Former architect in discussion with the author, July 28, 2016.

[23] The first edition of *Contracting With the Federal Government: A Primer for Architects & Engineers* (1969) was an important and routinely referenced book in the DMJM library. The Brooks Act led to an amendment to the Federal Property and Administrative Services Act of 1949, Title IX, "Selection of Architects and Engineers," requiring the federal government to select firms based on their competency, qualifications, and experience rather than by price. See: Gilbert A. Cuneo et al., eds., *Contracting with the Federal Government: A Primer for Architects and Engineers* (Silver Spring, MD: Committee of Federal Procurement of Architect-Engineer Services, 1974). For a more comprehensive history of legislation about fees, wages, and competition in architecture, see: Deamer, "The Sherman Antitrust Act and the Profession of Architecture."

military commissions to be posted through traditional channels, such as public solicitations released by the Pentagon (a building that DMJM would later be commissioned to renovate in 1992), the partners of DMJM intrepidly travelled alone to meet with military leaders. Navigating a fine line between entrepreneurialism and utter desperation, Mendenhall travelled to Washington, DC to meet directly with the Director of Air Force Installations in 1951, General Colby Myers, who offered him a "courteous few minutes" to suggest that DMJM solicit work from the Far East Air Force division, rather than domestically.[24] Back in Los Angeles, Daniel produced the firm's first brochure that "showed the availability of all 50 personnel," and he compiled names and contact information for commanders of US Air Force Bases. After combing through his address book and jotting down war-time contacts from his time in the Navy, Daniel sent scatter-shot letters and brochures to overseas command centers offering the firm's services following the outbreak of the Korean war in 1950, and he secured a $200 bank loan to pay for mailing fees.[25] Finally, Johnson travelled to London and to France in 1952, and he met with an architect of the Joint Construction Agency (JCA) in Chartres at the mere suggestion of a Los Angeles taxi driver. While deplaning in Los Angeles after one trip to London, Johnson was photographed raising a small glass bottle in which he captured London's "fog" to compare with LA's "smog"—a material record of both the "time" and "place" of his travels (*Figure 3.4*).

Daniel's flurry of letters caught the attention of the Strategic Air Command as well as the Far East Air Force division, which led to military base commissions that required DMJM to establish branch offices around the world. DMJM provided twelve draftsmen to assist with the production of drawings at the Far East Air Force base in Tokyo, where DMJM opened a branch

[24] DMJM, *1946-1955 Daniel, Mann, Johnson, & Mendenhall*, p. 9. AECOM company archives, Los Angeles, CA.

[25] "Daniel, Mann, Johnson & Mendenhall: How Teamwork Has Built a Thriving Architect-Engineer Firm," N.p.

office in 1952 (*Figure 3.5*).[26] The Tokyo office was initially managed by architect Jack Lipman, and it provided support for the construction of US Air Force bases as well as guided missile facilities in Japan, US Army facilities in Korea, and US Navy facilities in Taiwan. While the Tokyo office closed briefly in 1957 due to a decline in defense work, it was re-opened in 1961 by Stanley Moe and managed by Sven Svendsen, who was recruited by Phil Daniel from the Central Scientific Institute of Venezuela. By the 1960s, DMJM's Tokyo office represented the largest presence of a private US architecture and engineering firm in the east, with over 100 employees.[27] In France, Johnson established an office in the Latin Quarter of Paris, which was rented for 99 cents per day because, according to one historical account, "DMJM was in the right place at the right time."[28] Daniel's business technique of directly approaching local command persisted, and in 1953, at first notice there might be a need for a new military base, he flew to Okinawa to meet with the Air Force command, which resulted in the formation of a DMJM office there to support the construction of Naha Airfield and the Anderson Air Force Base in Guam (*Figure 3.6*).[29] Finally, at the beginning of 1954, offices in London and Washington, DC were opened, from which DMJM directly supported the efforts of the military (*Figure 3.7*). Both offices swelled to nearly 100 employees by the end of the 1950s. The firm as a whole grew to 500 by the end of the decade, with the majority of its employees located abroad. While the firm was still only half the size of other large-scale firms at the end of the 1950s, such as Skidmore

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[26] Ibid. Since DMJM was so eager to make military connections, the twelve draftsmen began work without a contract and without up-front pay, totaling $ 100,000, which exceeded DMJM's Bank of America limit of credit of $90,000. However, the "architectural practice," based in Los Angeles, they argued, kept the firm afloat until a contract was signed.

[27] Ibid.

[28] Ibid.

[29] "Daniel, Mann, Johnson & Mendenhall: How Teamwork Has Built a Thriving Architect-Engineer Firm."

Owings and Merrill, military projects rendered them equals in terms of construction output and revenue. Therefore, by mid-century, employee size alone did not adequately describe the economic or political significance of architecture firms as it did during the early twentieth century and under Fordist economies: while SOM was responsible for $141,370 worth of construction per employee in 1957, for instance, DMJM was responsible for nearly triple the amount, at $312,500 per employee.[30]

Many of the international offices were described as informal and flexible, though each office conformed to a uniform image of corporate practice that defied any sense of regional difference. By the mid-1950s, international work had become more important to DMJM's overall revenue than domestic work, due in part to the vast geographic breadth and experiences that military projects offered the firm. While DMJM remained a partnership in California until 1960, a separate international company, Daniel, Mann, Johnson, & Mendenhall International, was incorporated in 1954.[31] Other corporate architecture firms in the US followed suit, including The Architects Collaborative in Massachusetts, which formed the Architects Collaborative International in 1960 (though it dissolved in the mid-1990s) and Perkins & Will, which formed Perkins & Will International, Ltd. in 1973.

The incorporation of DMJM's international arm carried with it an image of practice abroad that matched that at home: men with their white buttoned-up shirts and black ties were

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[30] DMJM surpassed SOM by revenue in 1958. By 1957, however, SOM was comprised of 1066 employees compared to DMJM's 480, though DMJM was responsible for $150 million in construction, and SOM was responsible for $150.7 million. Editors of Architectural Forum, *The 1959 FORUM Directory of the 100 Biggest Architects, Contractors, Clients*; Editors of Architectural Forum, *The 1958 FORUM Directory of the 100 Biggest Architectural Firms, Building Customers, Building Contractors*.

[31] For scholarship on the subsequent globalization of architecture practices, see: Paul L. Knox and Peter J. Taylor, "Toward a Geography of the Globalization of Architecture Office Networks," *Journal of Architectural Education* 58, no. 3 (February 2005), pp. 23–32; Paolo Tombesi, "Super Market," *Harvard Design Magazine*, (Fall/Winter 2003), pp. 26–31.

surrounded by white walls and white drop-ceilings, and they were bound to their orderly drafting tables. Even further, however, as in DMJM's Los Angeles office, it was in the organization and business structures of the offices, rather than in their images, where both economic precarity and flexibilities were made visible. A 1960 article in *Architectural Record,* described DMJM's international offices as agile and "extremely flexible:"

> They [the offices] are set up, moved, or modified in accordance with the needs of the firm at a particular time. At present [1960], foreign offices are located in London, Bangkok, Honolulu, Saigon, Paris, Guam, Djarkata, and Caracas. Each of these has a primary reason for being.[32]

The DMJM Okinawa office, for example, was set up in an extruded, semi-circular Quonset hut from WWI, and plywood sheets were placed atop orange crates and used as chairs and tables.[33] These complex and flexible arrangements of architecture practice abroad posed many challenges to surveys and record-keeping in the US, however. In surveys conducted about American architecture firms working abroad, for example, DMJM's name was absent until the late 1960s, perhaps due to the specificity of its military commissions, which may have necessarily precluded the publishing of their work. In a survey completed during the 1960s, for instance, only three architecture companies—Harrison & Abramowitz, Architects; Holabird, Root & Burgess; and Skidmore Owings & Merrill, Architects—were recorded as fully international, and DMJM was not listed.[34] It was not until the mid-1960s that DMJM was listed among a group of eleven

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[32] "Office Organization and Procedures for Present-Day Practice."

[33] After years of production during WWII, Quonset huts were also available for experimental repurposing into domestic and religious structures by architects. See: Jean-Louis Cohen, *Architecture in Uniform: Designing and Building for the Second World War* (Montréal: Paris: New Haven [Conn.]: Canadian Centre for Architecture; Hazan; Distributed by Yale University Press, 2011), pp. 383-423.

[34] Juvenal L Angel, *Directory of American Firms Operating in Foreign Countries* (New York: World Academy Press, 1960), pp. 52-148.

architecture firms operating internationally.[35]

Stages and Stage Sets for the Cold War

Meanwhile, in Southern California, the prevalence of WWII aircraft manufacturing companies, such as Douglas, Hughes, Lockheed, and North American, enabled a seamless transition from aircraft to spacecraft production, and by the mid-1950s, aerospace surpassed film as the dominant industry.[36] The decentralized urban pattern and open land available for the testing of powerful nuclear weapons and rockets was prime for the burgeoning aerospace industry. Facilities could be located far enough apart to test radioactive materials and rocket engines in seclusion, yet close enough to coordinate institutional research of the many parts.[37] DMJM's experience designing military bases, as well as its central Los Angeles location, pulled it into the so-called "space age." By the mid-1950s, three-quarters of DMJM's military work was funded by the Air Force in missile and aerospace development, and, by the 1960s, DMJM's work on the ground was matched by its work in the sky. Not only was DMJM designing new missile

[35] By 1966, DMJM was listed among a group of eleven other architecture firms operating abroad. Revealingly, none of the firms listed in 1960, including SOM, were reported as working internationally by 1966, suggesting that a new generation of American architecture firms had emerged at the international scale. Juvenal L Angel, *Directory of American Firms Operating in Foreign Countries* (New York: World Academy Press, 1966). For an analysis of these figures and the globalization of architecture more broadly, see: Jeffrey W. Cody, *Exporting American Architecture, 1870-2000*, Planning, History and the Environment Series (London; New York: Routledge, 2003), pp. 123-155.

[36] By the 1980s, nearly 40 percent of all US missile and aerospace business resided in southern California. See: Jeffrey W. Cody, *Exporting American Architecture, 1870-2000*, (London; New York: Routledge, 2003).

[37] At a national scale, the National Security Resources Board and the US Department of Commerce established a program that attempted to encourage dispersed industries for defense contracts, offering incentives for new defense-related production to distribute across vast urban areas. As historian David Monteyne has pointed out, such dispersal policies failed in the 1950s, yet industrial dispersal took place without explicit policy. See: David Monteyne, *Fallout Shelter: Designing for Civil Defense in the Cold War*, Architecture, Landscape, and American Culture Series (Minneapolis: University of Minnesota Press, 2011), p. 11. For a historical examination of the aerospace industry in Los Angeles, see: Wade Graham, "Blueprinting the Regional City: The Urban and Environmental Legacies of the Air Industry," in Peter J. Westwick and Huntington-USC Institute on California and the West, eds., *Blue Sky Metropolis: The Aerospace Century in Southern California*, (Berkeley, CA and San Marino, CA: The Huntington Library and the University of California Press, 2012).

bases for the Air Force, but the firm operated its own airplane as a branch of the firm, "DMJM Aerial & Associates," which provided aerial survey services for the federal government by using photogrammetric techniques and electronic geodesy to study urban areas in South America and South Africa. In conformance with the secrecy of work that had been established elsewhere in practice, such work within DMJM was covertly described and frequently accounted for as "master planning" (*Figure 3.8*).[38]

Moreover, military work not only helped DMJM to expand its geographic and economic footprint through its projects, but it also helped to transform the firm into an institution for military training itself. The accumulated breadth of experience in aerospace work led to DMJM's enrollment in the Air Force's "Education with Industry Program," which permitted military officers to take nine-month tours of duty to train at DMJM, where they studied and refined management techniques.[39] And, by the 1960s, according to at least one article in *Fortune*, the architects and engineers at DMJM had emerged not as designers of a "cultural world," but instead as designers of "space" itself:

> DMJM's main interests and passions lie outside the cultural world: in urban-renewal problems…and not only in the design of large spaces—which is how architects traditionally define their craft—but in space itself. DMJM's interest in the 'space business' is a natural outcome of its jobs in the missile field...You name it, this company of architect-engineers has designed it: dams, schools, hydroelectric plants, apartment houses, air bases, 'hard' missile complexes. Next? Maybe lunar and space stations.[40]

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[38] By the mid-1960s, DMJM's airplane was also utilized for surveys associated with urban infrastructure planning and development activity, including "mining and petroleum exploration," as well as the development of "unexploited natural resources"—all which took place under the auspice of "DMJM Aerial & Associates." Former Controller in discussion with author, April 5, 2017. Also see: "DMJM MGMT. GOES AERIAL, FINANCIAL," in DMJM, *NEWS* (1964), p. 3. W. Coburn Papers, Los Angeles, CA.

[39] Among a collection of more than 35 industries active in the early 1960s, DMJM was the only architecture/engineering firm in the military training program. "Architectural Firm Joins in New Program," *Los Angeles Times*, October 7, 1962, p. M22.

[40] Freedgood, "'Dimjim': Architects for the Space Age," p. 121. Also see: David B. Carlson, "Buildings for the Space Age," *Architectural Forum*, (September 1960).

In its 1964 annual newsletter, DMJM reported that the firm grew in parallel with the aerospace industry in Los Angeles. However, the designing of "space" could also be interpreted in a second way. DMJM had established a material presence in cities across the globe, and thus the literal and figurative distances between DMJM's offices, like the military's bases, could be viewed as equally designed, as well as the professional distances between the firm's primary architectural and engineering services and its "peripheral," profit-generating subsidiaries.

Describing itself as "the generating center for new ideas which stimulate the developing American culture," rather than the generator itself, DMJM's offices abroad were responsible for producing many omnipresent foundations—military bases—from which the US could ostensibly protect itself, as well as impose discipline and order upon the world.[41] Domestically, DMJM's contracts during the Cold War cut through the entire spectrum of aerospace research—from rocket engines to nuclear reactors—by designing the foundations common to all phases of aerospace development: foundations for testing. Amidst atomic threat, the structures required to test nuclear and mechanical forces affirmed the arrival of a new site for battles between nations. Rather than on a battlefield where two aggressors met, Cold War battles played out domestically and in the confines of discrete chambers, on deserted land, and upon military bases, where rockets were launched and bombs detonated. And while the public eye was fixed on the performativity of the missiles and rockets as the ultimate demonstrations of capitalist power, test results circulated in the form of photographs, news reports, and scientific data. However, the sites and the structural chambers that made testing possible were as significant as the objects and machines being tested within them. Like Hollywood sets designed and assembled within fully enclosed and windowless sound stages that absorbed ambient noise in order to amplify the voices

[41] DMJM, *NEWS* (1964), W. Coburn Papers, Los Angeles, CA.

of actors, testing chambers enabled materials and machines—the weapons of war—to perform in simulated environments.[42]

Subjected to extreme environmental conditions, weapons were tested in windowless enclosures or upon launch pads designed to be indestructible, and they absorbed immense force, sound, heat, and radiation from out-of-world simulations, explosions, and blast-offs.[43] The production of tests was not unlike the production of films, since each resulted in texts that were ripe for analysis and interpretation. Architectural historian Alessandra Ponte has argued in her study of Cold War nuclear tests at the Nevada Test Site—where entire buildings, shelters, and materials were subjected to simulated nuclear attacks in the 1950s—that the results of tests did not produce "truths."[44] Instead, they produced texts and narratives for perpetual interpretation and re-interpretation. Following Nietzsche's position that a "test" was merely a rhetorical means by which to expose new questions, Ponte asserted that results of a test

> do not offer any 'truth,' nor do they moralize, condescend, or preach; they are forever provisional…[they] open up the possibility of more tests, of an endless testing of sites that become the canvases upon which one can set out to write, to paint, or to build; or to incise, to wreck, and to ruin.[45]

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[42] Tracy Davis, in her study of Cold War civil defense, argued that defensive practices of duck and cover, evacuations, and shelter construction constituted a form of rehearsal rather than performance. Performances of defense, she argued, would transpire only in the event of a real attack. Tracy C. Davis, *Stages of Emergency: Cold War Nuclear Civil Defense* (Durham; London: Duke University Press, 2007), p. 90.

[43] In his study of missile accuracy testing, sociologist Donald Mackenzie argued that missile "tests" were primarily associated with the production of knowledge about human artifacts and technology. Mackenzie, as does Alessandra Ponte, points out that "testing" has historically referred to human-made objects and technology, while "experiments" pertained to the natural world. However, most historians and sociologists of science have recognized that the issues raised by the experiments in science could similarly be raised by the testing of technology. One example of the interchangeability of terms was Bruno Latour's study of laboratory experiments. For Latour, testing was but one part of the scientific construction of facts: Latour and Woolgar, *Laboratory Life*. See: Donald Mackenzie, "From Kwajalein to Armageddon?" in *The Uses of Experiment: Studies in the Natural Sciences [1989]*, ed. David Gooding, Trevor Pinch, and Simon Schaffer (Cambridge: Cambridge Univ. Press, 1993), p. 411.

[44] AECOM was hired in 2006 by the federal government to maintain and operate the Nevada Test Site, including the over 500 facilities, laboratories, infrastructure, vehicles, and communications systems. See: Rodengen, *AECOM: 20 Years and Counting*, p. 30.

[45] Alessandra Ponte, "Desert Testing," in Antoine Picon and Alessandra Ponte, eds., *Architecture and the Sciences: Exchanging Metaphors*, Princeton Papers on Architecture (New York: Princeton Architectural Press, 2003), p. 111.

Therefore, DMJM's military projects can be understood like those of Hollywood: as the foundations, canvases, or backdrops upon which the military could demonstrate its strength and power.

For North American Aviation, DMJM designed an Aviation Hot Test Acceptance Facility and Liquid Oxygen Plant at the Rocket Engine Field Laboratory in Santa Susanna, California in 1956, where early rocket engines were tested and nuclear reactors were developed thirty miles from downtown Los Angeles. For Douglas, DMJM designed a 245-Acre Space Systems Center in Huntington Beach, California, which included a structural testing laboratory in which nearly 6,000 scientists and engineers tested fifty-eight foot tall rockets, primarily for NASA, in addition to thermal chambers for testing the performance of materials in temperatures up to 3,000 degrees Fahrenheit and in simulated out-of-space conditions.[46] Like the sound stages used for film productions, the Space Simulation Chamber and the Structures Test Laboratory were designed with inverted interiors, exposing their structural reinforcement and focusing all attention on the performances within (*Figures 3.09-3.11*). Among many others, DMJM also designed the Sonic Fatigue Research Facility in 1961 at the Wright-Patterson Air Force Base in Dayton, Ohio and the White Sands Missile Testing Range in New Mexico, which included a first-of-its-kind high-intensity sound test chamber.[47] Finally, DMJM designed the testing and launching facilities for missiles and space vehicles, including Test Stands 11 and 13, as well as Launch Pads 12 and 14, at Cape Canaveral Air Force Station in Florida, which were used to launch the first American,

[46] DMJM, *1956-1965 Daniel, Mann, Johnson, & Mendenhall* (Los Angeles, CA, n.d.), p. 11. AECOM Company archives, Los Angeles, CA.

[47] Other test facilities included: A research and Engineering Center for the Ford Motor Company's Aeronautic Division in Newport Beach, CA; the Mariner B Assembly, Test, and Sterilization Facility for spacecraft for Cal Tech's Jet Propulsion Laboratory in Pasadena, CA in the 1960s; a Hot Test Facility for Lockheed's Missile Division in Santa Cruz, CA; and later, the Aeropropulsion Systems Test Facility at Arnold AFB, Tullahoma Tennessee.

John Glenn, into orbit.[48] Like a sound stage for Hollywood, the Ground Support Facility at Cape Canaveral also resembled the anonymous, rectilinear boxes constructed as Hollywood studios; the renderings abstracted the building's facades and roof, and the monolithic surfaces did not include fenestration, which concealed the building's bones by leaving the irrelevant parts of the building's exterior—those not imperative to the testing within—unfinished (*Figure 3.12-3.13*).

The Construction of Proof: Describing the World

While DMJM designed the stage sets and enclosures in which testing could take place, the information produced by the tests and the language of testing itself was folded into practice by architects at DMJM as a means to construct mathematical "proofs." During weeknights, Phillip Daniel attended seminars and classes to learn about mathematics and computation, which manifested most clearly in his affiliated computer company in 1971, Logicomp, which he established initially for the Army Corps of Engineers research laboratory. In architecture practice, however, Daniel argued that mathematics could help DMJM to "validate" designs and site plans before projects were even constructed. As historian of science Theodore Porter has revealed, the Latin root of the word *validity* is power, and thus the use of quantitative methods by Daniel in order to *validate* design decisions could also be viewed as a political act. The use of mathematical technique in modern bureaucracy, Porter argued, provided the public with a common language of uniformity that helped to establish trust—for DMJM, trust in an architect's

[48] Now a historical monument, the Atlas Mercury Launching Pad No. 14 was the blast-off site for John Glenn, Scott Carpenter, and Walter Schirra's first man-in-space launch. Additional launch pads designed by DMJM included those built at Wallops Islands off the coast of Virginia and satellite launching pads at Vandenberg Air Force base in California. Curriculum Vitae, W. Coburn Papers, Los Angeles, CA.

decisions—but its use also imposed a form of discipline upon others.[49] In an article titled "Application of Operations Research for Site Planning Facilities Support," published in *Aerospace Engineering* in June of 1961, Daniel claimed that the historical process of architectural design was often "dangerously" based on intuition and iteration rather than on calculated precision or "proof;" therefore, time and money was wasted.[50] Historically, he suggested, a design process would begin by an architect who gathers the criteria about a building's program, site limitations, and potential consultants before moving to a conceptual design stage, and then to a design development stage, at which point:

> …a senior designer, along with others, produces 30, 50, or perhaps hundreds of sketches on flimsy paper until he intuitively recognizes one or more of the concepts to be sufficiently good to warrant concentrated additional development for final designs. At no time is there a formal testing of the validity of designs…This is the common process used today. It has been used for the last 2,000 years!...There is no proof of 'what was done' or 'why it was done…This lack of proof is not only unfortunate, but dangerous.[51]

Instead, Daniel proposed a mathematical process that used the data gathered from material tests to help pre-determine the locations of buildings and—most importantly—the exact spacing between them prior to designing, in an effort to produce a "record" of "evidence and proof." In one illustrated example, Daniel considered the distance between two potentially interfering structures, such as a hazardous reactor building and a laboratory, and he drew a ballistic missile standing ready to launch in the background (*Figure 3.14*).

To determine the optimal distance between the laboratory and the reactor building, he devised a calculus-based formula that considered cost as a function of distance: the maximum

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[49] Theodore M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton, N.J: Princeton University Press, 1995).

[50] Phillip J. Daniel, "Application of Operations Research for Site Planning Facilities Support," *Aerospace Engineering*, (June 1961), pp. 26–27, 81–84.

[51] Ibid., p. 26.

distance needed for safety (more expensive as they were closer together, due to potential damage) was considered as a function of the minimum distance needed for infrastructure to connect them (less expensive as they were closer together).[52] Architects and their mathematics, the formula implied, could become the agents through which material possibility and economic reality were reconciled. In other words, Daniel's interest in constructing a mathematical "proof" demonstrated a desire to reach a sense of finality or truth by accumulating all available data—produced through tests—to define a single point of hegemonic agreement.[53] However, unlike the kind of data and results generated by a test, which, alone, resisted a sense of finality or truth to afford open-ended interpretations, the production of a "proof" revealed a desire to turn data into power: to establish a theory that, according to philosopher Karl Popper, aimed to *describe* the world, like Hollywood films, rather than to produce information about it.[54] Therefore, while the *projects* of DMJM supported the production of narratives ripe for individual interpretation through the very materiality of the built environment, Daniel's search for "proof" suggested that the *practices* of corporate architecture sought calculated, narrative resolve by absolving individuals and stripping them of the possibility to interpret by accumulating as much data through experiences as possible—channeled through DMJM's practitioners as well and the materials with which they encountered—in order to simultaneously validate DMJM and the military.

Daniel's publication could also be interpreted as a form of marketing plan for DMJM—a

[52] Ibid., p. 83-84.

[53] Here I refer to the concept of hegemony as described by Antonio Gramsci. See: Antonio Gramsci, "Hegemony, Relations of Force, Historical Bloc" in David Forgacs, ed., *The Gramsci Reader: Selected Writings, 1916-1935* (New York: New York University Press, 2000), pp. 189-221.

[54] Karl Popper, *The Open Society and Its Enemies* (London: Routledge, 2002), pp. 263-264.

plan that Theodore Porter would suggest was built upon the establishment of trust—since it implied that the firm might be more reliable than other architecture firms due to its ability to construct quantifiable proofs. Yet in Daniel's formula and corresponding illustration, all of the design decisions typically made by architects, including the production of "hundreds" of drawings and "flimsy sketches," were substituted by a single calculation and a single dimension: the distance between buildings in plan. This distance—between the reactor and the laboratory—could be viewed as an analogy for DMJM's subsequent conglomerate structure and the spatio-economic distances between DMJM and its subsidiaries. At the risk of over-stretching the analogy, the subsidiaries and affiliated companies at DMJM might be understood like the nuclear reactor and the deterrents it supported, since they were described as the performative, outward-focused, and "extensive" "profit centers" standing in contrast to the traditionally internally-focused and labor "intensive" work of the architect, akin to the laboratory in Daniel's illustration. The opportunity for design, then, lay not in the specificity of the drawings produced by architects and engineers, nor the particularities of the work within a subsidiary, but instead in the distance between them: not too close together, yet not too far apart.

Finally, Daniel's interest in truth and the construction of "proofs" rendered visible the ways in which the practices of corporate architects resembled that of Hollywood, since they were able to both gather information about the world and reproduce it as a single, determined narrative. In Horkheimer and Adorno's description of the "culture industry" (most of which was based on their analysis of Hollywood), they argued that mass culture had political implications. Popular culture constituted a single homogeneous "culture industry" that ensured the obedience of the masses to market interests by rendering people docile and satisfied, as well as by lulling them into complacency. In contrast to classical Greek tragedy, which resisted narrative resolve—

like the logic of a "test"—in order to keep the individual alive, individuals were now forced to seek refuge in society by identifying with it and renouncing their individuality as the ultimate defeat of tragedy.[55] Thus in practice, the drawings, site plans, and renderings produced by the architects for the military, just like those produced by film designers and art directors for Hollywood, sought to impress the power of capital upon the masses by identifying a single, resolute account of the world. Indeed, the two were fully intertwined, as test-launches of rockets and missiles colonized the columns of local newspapers, radio, and academic circles, while Hollywood films took on the subject of "noir."[56]

Deterrence: Titan I Intercontinental Ballistic Missile Bases

The Cold War pushed architects in the US onto the front line of civil defense as designers of bunkers, fallout shelters, and organizational plans as the nation prepared for the possibility of nuclear doom. Bunkers and disaster planning saturated architecture discourse during the 1950s and fueled professional debate about the ethics of wartime preparations; architects including Albert Mayer, Victor Gruen, Clarence Stein, and Charles Moore pledged support for such efforts against an otherwise strong wall of professional resistance. [57] In striking contrast to defensive measures, however, which architecture scholars have described were the primary means by

[55] Max Horkheimer and Theodor Adorno, "The Culture Industry: Enlightenment as Mass Deception [1944]," in *Dialectic of Enlightenment*, ed. Gunzelin S. Noerr (Stanford, Calif: Stanford University Press, 2002), p. 124.

[56] Edward Dimendberg has revealed the ways in which Cold War espionage and the anxiety of nuclear war infiltrated the narratives of films, from *The Their* (1952), to *Kiss Me Dearly* (1955), to *City of Fear* (1959). See: Edward Dimendberg, *Film Noir and the Spaces of Modernity* (Cambridge, Mass: Harvard University Press, 2004). For coverage of missile launches in newspapers, see: "First Titan ICBM Is Fired at Canaveral," *Chicago Daily Tribune*, February 7, 1959; "First Titan Fired; Called Successful Over Short Range," *New York Times*, February 7, 1959; and Richard F. Roper, "Titan in Successful Test Flight," *Atlanta Daily World*, April 4, 1959.

[57] Monteyne, *Fallout Shelter*, p. xix. In 1951, The *Progressive Architecture* journal published a symposium dealing with the "pros" and "cons" of architects' involvement in Civil Defense: "The PROS and CONS of Architecture for Civil Defense," *Progressive Architecture*, (September 1951), pp. 63–79.

which architects were implicated in the military, architecture firms such as DMJM also held less-studied *affective* roles during the Cold War, through deterrence. Deterrence was not entirely disconnected from defense, however. Indeed, the concept of deterrence was wholly dependent upon defense at least until the 1960s. Civil Defense Director Leo Hough argued in a 1958 *Architecture Forum* article that defense alone could be viewed as a deterrent, claiming that "an effective civil defense is a deterrent to war."[58] Architectural historian David Monteyne has similarly argued that the material robustness and geographic dispersal of "bunker architecture" served as an aggressive deterrent due to its inherent indestructibility throughout the 1950s.[59] Nonetheless, in the 1950s, as anxieties grew about the Soviet Union's development of a long-range atomic weapon capable of severely attacking the United States, President Dwight D. Eisenhower elevated the deployment of the nation's first Intercontinental Ballistic Missile (ICBM) program to the highest research and development priority in 1955.[60] While the military's primary systems of air defense, such as surface-to-air missiles and anti-aircraft artillery batteries, were viewed as the country's first line of defense against a potential attack, the ICBM program was foregrounded as the nation's principal system of nuclear "deterrence," and it was intended to instill a sense of fear into the minds of aggressors and to discourage them from attacking the US altogether.[61] As urban theorist Lawrence Vale has argued, the rationale for deterrence was rooted

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[58] "Fallout Shelters," *Architectural Forum* (April 1958), p. 57. For the architect's role in defense, see: Tom Vanderbilt, *Survival City: Adventures among the Ruins of Atomic America* (New York: Princeton Architectural Press, 2002), and Monteyne, *Fallout Shelter*.

[59] Monteyne, *Fallout Shelter*.

[60] Ibid, p. 42.

[61] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Washington, DC: Department of Defense, 1996).

not in the ability to threaten, but in the ability to construct a credible *perception* of threat.[62] Since the presence of impenetrable buildings or bunkers alone would not itself dissuade an adversary from attacking, the strength of deterrence relied on an aggressor's perception that the US—as well as the engineers and architects that produced its infrastructure—had a detrimental retaliatory capability.

By the 1960s, deterrence was folded into military policy by the newly elected President John F. Kennedy and his Secretary of Defense, Robert McNamara—the Harvard-trained business executive who, prior to his government post, was hired by Henry Ford II to oversee and eventually lead Ford Motor Company. Kennedy argued that civil defense could not ensure complete protection against a nuclear attack, and he reduced funding for civil defense projects as well as the size of the Office of Civil and Defense Mobilization in order to focus resources on deterrence. In an address in 1961, he defined deterrence as more imperative than defense, suggesting:

> We will deter an enemy from making a nuclear attack only if our retaliatory power is so strong and so invulnerable that he knows he would be destroyed by our response. If we have that strength, civil defense is not needed to deter an attack. If we should ever lack it, civil defense would not be an adequate substitute.[63]

After the Soviet Union announced that it had an operational ICBM in August of 1957 and launched Sputnik two months later, all eyes turned to the development of ballistic missiles to close the so-called Eisenhower-induced "missile gap," bringing with it new opportunities for

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[62] Lawrence J. Vale, *The Limits of Civil Defence in the USA, Switzerland, Britain, and the Soviet Union: The Evolution of Policies since 1945* (Basingstoke, Hampshire: Palgrave Macmillan, 1987), pp. 41-42.

[63] President John F. Kennedy, "Special Message to the Congress on Urgent National Needs" (Washington, DC, May 25, 1961). US National Archive, Papers of John F. Kennedy, John F. Kennedy Library, Boston, MA.

architects and engineers, as well as designers of films.[64]

The nation's first ICBM program was the Atlas, and it required launch-stands and facilities designed by architecture and engineering firm Holmes & Narver of Orange, California, with missiles manufactured by the Consolidated Vultee Aircraft Corporation (Convair) outside of San Diego in a modernist manufacturing plant designed by Charles Luckman and William Pereira, also of Los Angeles. In 1954, Air Force Secretary Trevor Gardner established a Western Development Division (renamed the Ballistic Missile Division in 1957) to oversee the development of the missile program under the direction of Brigadier General Bernard A. Schriever in Inglewood, California—a location within relative proximity to Convair's fabrication facilities, which was the site where a second ICBM program, the Titan, would begin its conceptual planning with DMJM.[65] In January of 1958, the Ballistic Missile Division invited DMJM and twenty-six architecture and engineering firms from a list of 300 possible firms to attend a top-secret briefing with the Ballistic Missile Division's Deputy Commander for Installations, Colonel William E. Leonhard. DMJM sent then-partners Kenneth Johnson and Douglas Russell (who was formerly DMJM's management consultant from Booz Allen Hamilton) to the meeting, where Leonhard revealed the government's plan to develop the Titan I.

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[64] Several efforts during the 1950s by the Eisenhower Administration to balance budgets led to cuts in ICBM funding. Though funding was restored in the fall of 1957, development time was lost. By 1959, the Soviet Union was estimated to have 100 Missiles to the US's none. By 1963, the Soviet Union was estimated to have 2,000, and the US 130. One writer who perpetuated the missile gap narrative was Joseph Alsop, who wrote for the *Washington Post.* See: Joseph Alsop, "Matter of Fact: Facts about the Missile Balance," *Washington Post*, September 25, 1961.

[65] Locating the field office in Inglewood was an effort to deflect attention from the activities of the office. At first, the WDD office was temporarily occupied a former Catholic School, in which Schriever occupied the principal's office and the chapel was a conference room, and military personnel were specifically instructed to wear civilian clothes. David K. Stumpf, *Titan II: A History of a Cold War Missile Program* (Fayetteville: University of Arkansas Press, 2000), p. 3.

The concurrent development of both the Atlas and Titan was hotly debated due to their functional similarities; however, both programs were advanced so that national deterrence was not overly dependent on the singular, yet-to-be tested, Atlas program. Like the military work for DMJM itself, the Titan served as a hedge in the event that the Atlas failed, and it added competitive pressure to the development of the ICBM, since the design and manufacturing contracts of the missiles were awarded to separate companies, to avoid complacency.[66] The Titan I program included a much larger and more powerful missile with nearly twice the capacity of the Atlas, and it had an increased travel distance due to a full two-stage propulsion system.[67] The Atlas was initially designed as a "soft," above-ground system, while the Titan project was to be fully "hardened" with underground silos in which the missiles would remain until rising on elevators, to be launched from ground level in less than fifteen minutes (*Figure 3.15*).

Yet the Titan I facilities demanded an unprecedented coordination of material, scientific, and technological expertise. As the largest and most expensive underground launch complex the US had ever built, the Titan project represented a pivotal shift in terms of architecture.[68] It required an entirely new type of protective structure for the missile, as well as buried control centers and powerhouses to give the US a "second-strike" capability—a capability to absorb thermonuclear overpressure of 100 pounds per square inch (the equivalent effect of a three-megaton Hydrogen bomb exploding one mile away, or the shock of 50 times the force of gravity)

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[66] David K. Stumpf, *Titan II: A History of a Cold War Missile Program* (Fayetteville: University of Arkansas Press, 2000), p. 14.

[67] See: Lonnquest and Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program.*; Freedgood, "'Dimjim': Architects for the Space Age." Marvin J. Kudroff, "The First Titan Hardened Facilities," *Aerospace Engineering* (June 1961), pp. 10–11, 41–46.

[68] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Washington, DC: Department of Defense, 1996), p. 70.

in addition to ground shock, radiation, fallout, and thermal effect—and still fire back. The goal of "hardening" the missiles underground was, as Colonel William Leonhard described, "not for the sake of hiding—hiding is kidding ourselves—but for protection."[69]

It was specifically the production of the Titan I, including the complexity, scale, and rate of its development and construction, that revealed a need at DMJM for multiple architecture and engineering firms to work together through joint-ventures, which served as direct precursors to corporate conglomeration. The ICBM complexes were required by the Air Force to be designed by "architect-engineers," and they demanded specializations that no single engineering or architecture firm at the time possessed. As one engineer at DMJM asserted: "for the first time, this nation's retaliatory forces…would be just as dependent on A-E [Architecture-Engineering] designed facilities as on the weapon itself," again conflating the experiential capacity embodied by architecture and engineering firms and the disciplinary power of the military's weapons.[70] Yet a common misconception about the work was that it was strictly engineering work, implicit in the definition of "architect-engineers" as outlined in government policy and protocols for selecting firms for federal work, rather than "engineer-architects" or, more accurately, "architects and engineers."[71] As one engineer noted, "our architects are only involved to the extent that the project deals with people—personnel quarters and such facilities…The vast majority of missile

[69] William Leonhard, quoted in "Now--Millions for Missile Bases," *Engineering News-Record*, (February 1958), pp. 22-23.

[70] Kudroff, "The First Titan Hardened Facilities."

[71] While Public Law referred distinctly to both "Architecture Firms" and "Engineering Firms" in the procedures for procuring government work, the language written in both DoD and GSA procurement policies interpreted such firms as "Architect-Engineers" as a single category. However, in reports by trade journals, such as *Engineering News-Records,* "Architects-Engineers" are defined as those with more architectural work than engineering work, and "Engineers-Architects" as the inverse. See: Cuneo et al., *Contracting with the Federal Government: A Primer for Architects and Engineers*.

installations involved straight engineering work."[72] However, of the firms most active in national defense and deterrent programs, including firms whose revenues were driven predominantly by "engineering," such as engineering firms Ralph M. Parsons Co. of Los Angeles, Bechtel Corporation, and Giffels & Rosetti of Detroit, DMJM was deemed "the most successful firm of all in getting missile work."[73] By the end of the 1960s, DMJM was responsible for the majority of ballistic weapon facility commissions and thus heavily depended on state patronage—the kind of patronage that was rare during the nineteenth-century formation of American architecture profession—by holding the largest share of nearly $1 billion worth of construction, and the firm's military contracts dwarfed those of other architecture and engineering firms, such as Skidmore Owings and Merrill (*Table 2.0*).[74]

Moreover, while the Martin Company was responsible for the Titan missile, architecture and engineering firms were required to "demonstrate familiarity with the *effects* of weapons" in their proposals, "from heat, radiation, earth shock, and blast effect."[75] Due to the wide range of "familiarity" required, Johnson organized a joint-venture with three other firms, collectively titled "DMJM and Associates," which represented a shift toward project-by-project organizations of work with outside companies and a direct pre-cursor to mergers and acquisitions for DMJM by the end of the 1960s. Therefore, the military projects of DMJM's not only helped the firm to

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[72] Carlson, "Buildings for the Space Age," p. 117.

[73] Southern California was consistently home to the highest concentrations of large architecture firms: In 1970, 12% of the top 50 firms listed by revenue were located in Southern California; by 1990, Southern California was home to 18%; by comparison, Chicago had 8% and New York 4%. See: "The Top 500 Design Firms," *Engineering News-Record* (April 1991). and "Top 500 Design Firms," *Engineering News-Record* (May 1971).

[74] Freedgood, "'Dimjim': Architects for the Space Age," p. 121. For analyses of the military-industrial complex and SOM, see: Reinhold Martin, *The Organizational Complex*.

[75] Emphasis added. "Now--Millions for Missile Bases."

establish an international presence, but their scale, complexity, and pace of construction made joint-ventures and multi-firm practices necessary. Beyond architecture and engineering, it was in military journals, including in *Missiles and Rockets,* that mergers and acquisitions were most routinely and thoroughly announced, including of defense contractor and conglomerate companies such as Litton Industries, whose products ranged from navigation, communication, and warfare electronics to microwave ovens, or Textron, which was also a government contractor, that formed as a textile manufacturer of yarn and then parachutes for World War II before diversifying into aircraft manufacturing in the 1960s.[76]

At DMJM, contracts for joint-ventures were used initially as a means by which to diversify and to grow the company, as well as to account for potential "deficiencies" in experience or labor capacity. By enabling a greater distribution of risk and labor, DMJM was able to win significantly more contracts than any single firm.[77] As one architect recalled:

> We would try to utilize the complementary benefits of the companies we partnered with to be more powerful and competitive…Where we might be deficient in some area, we would try and partner with a company more experienced in that area. Joint-ventures weren't the best solutions for DMJM because of the shared revenue and shared risk involved, so we moved to outright mergers and acquisitions with more of a conglomerate structure.[78]

Carefully considering the distances between each firm's experiences, much like Daniel did in his calculated distances between reactor buildings and laboratories, the first firm that DMJM

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[76] For announcements of "mergers" and "expansion" among military-affiliated conglomerates, especially see: *Missiles and Rockets* (1960).

[77] At the same time, the film industry was similarly shifted away from the studio-based system and turned to independent producers to develop films in the 1950s, replacing the "term contract" under which writers, actors, and production designers worked for one studio and for a specified period of time, with a "film-to-film contract." Michael Storper and Susan Christopherson, "The City as Studio; the World as Back Lot: The Impact of Vertical Disintegration on the Location of the Motion Picture Industry," *Environment and Planning D: Society and Space* 4 (1986), pp. 305–20.

[78] Former DMJM architect in interview with the author, April 18, 2016.

selected for the joint-venture was the engineering and construction company Mason & Hanger-Silas Mason of New York, which specialized in tunnel design, blasting, and radiation protection.[79] The second firm of the joint-venture was Leo A. Daly of Omaha, Nebraska, an architecture firm that had produced an underground headquarters for the Air Force's Strategic Air Command in Omaha, Nebraska in 1954.[80] The third company was Pittsburgh-based chemical-engineering firm Rust Engineering Co., which, prior to WWII, had designed an Atomic Energy Commission plant at Oak Ridge, TN, as well as a TNT plant in Paducah, KY in 1942.[81] Johnson assembled the proposal, which detailed DMJM&A's management structure, the group's qualifications based upon the collective experiences of each firm, as well as a timeline for the design and construction of the Titan work.[82] Johnson submitted the five-pound document at 4:00 am on the day of the deadline, January 23, 1958, which was reviewed alongside nearly a dozen other proposals. A twelve-person selection committee met to analyze the proposals, considering the technical capabilities and the operational organization of each of the firms' proposals, and DMJM&A was awarded the contract in February. The committee argued that it was the broad range of experience offered by DMJM&A that rendered it prime for military work. The

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[79] Two important precedents of Mason & Hanger-Silas Mason were the Lincoln tunnels constructed for the New York Port Authority in 1954, and, Silas Mason (prior to merging) engineered the US Atomic Energy Commission's Nevada Test Site. At the Nevada Test Site, which was established in 1951, scientists, military, and professions simulated buildings and houses in controlled conditions to test the effects of nuclear explosions. The test site was surveyed and outlined by the architecture-engineering firm Holmes and Narver, which included facilities, such as towers, bunkers, instrument stations, and complexes. Holmes and Narver was a firm that would later become part of AECOM and merged with DMJM.

[80] Prior to the design of the new underground facility, SAC was located in the former WWII complex built for the Martin Bomber Company, designed by Albert Kahn Associates.

[81] Carlson, "Buildings for the Space Age," p. 178.

[82] In the 1970s, the project proposal system was one in which DMJM fine-tuned. Prior to closing each project, a project was required to be photographed and its description written so as to develop a consistent method by which to develop a catalog and portfolio of projects, as well as to make the project readily available for use in future proposals or deliverables. In each monthly report, the project would not be formally "closed" until these records were produced. Former architect in discussion with the author, April 5, 2017.

DMJM&A proposal scored especially high in terms of the firms' collective record of construction efficiency and past experience with military projects. One report argued that DMJM&A was selected because it "had an exceptional record for minimal change orders on government work, which was especially important to a budget-minded military."[83] Finally, the breadth of experience was matched by the sheer volume of collective laborers required to produce the drawings at a rapid pace. Full concepts for the prototype were due by the end of April, and construction was to begin in July.[84]

Johnson was named the Titan project manager—a fitting assignment for the prior Hollywood actor, since the Titan's missile bases were routinely described as a military performance with powerful deterring affects. Yet the connection between the Titan bases and Hollywood stage sets was even more direct. As economic tides in Southern California had shifted during the 1950s from Hollywood to aerospace, the film industry was doubly challenged by the onset of television, and studio art departments were waning.[85] Like the architects during the Depression who turned to film for work, art directors and production designers now turned back to architecture. A cutaway rendering of a typical Titan silo included in DMJM's marketing materials depicted a dramatically roaring Titan missile standing in launch position after emerging from its fortified lair, ready to fire into the sky (*Figure 3.16*). Yet the softly focused grayscale drawing was not the work of an architect nor engineer at DMJM; rather, it was the work of the Oscar-winning Hollywood Art Director and USC architecture alumnus, Jack Martin Smith, who

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[83] David B. Carlson, "Buildings for the Space Age," p. 118.

[84] The contract was the cost plus a 5.7 percent fixed fee, which totaled nearly $2.85 million in fees. This contract structure ruled out the possibility of smaller or singular firm proposals, since each would need to support itself for at least six months. Freedgood, "'Dimjim': Architects for the Space Age," p. 125.

[85] Storper and Christopherson, "The City as Studio; the World as Back Lot: The Impact of Vertical Disintegration on the Location of the Motion Picture Industry," p. 308.

was known for his work as a lead artist and production designer for *The Wizard of Oz* (1939), and later as art director for *Cleopatra* (1963), *Fantastic Voyage* (1966), and *Hello, Dolly!* (1969). The rendering was reminiscent of Martin Smith's pre-production drawings of upturned test-tubes clustered together for Emerald City in *The Wizard of Oz*, for which the physical set of realism counterbalanced a dreamy backdrop to produce "theatrical realism" (*Figure 3.17*).[86] While the underground of Emerald City remains but a figment of the imagination, the rendering of the missile, like the missile itself, served a new function as both a form of military deterrent and Hollywood persuasion.

A New Politics of Truth: "Hollywood Hard" vs. "Hard"

The construction of each Titan complex was a massive undertaking akin to constructing an entire city, and thus it reinforced the relationship between large architecture practices and their ability to produce entire urban political economies.[87] In order to describe the relative size of the Titan in trade journals and in newspapers, its construction was measured in terms of houses, suggesting that the long-standing unit of architectural production—the individual house—was superseded by the collective: the amount of concrete poured for each complex was enough to form 1,100 residential foundations; enough electricity to supply over 400 houses; and enough air ventilating capacity to condition 200 houses.[88] The initial Titan contract included testing,

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[86] Rickey, "Art Directors: Theatrical Realism." Jack Martin Smith argued that the concept of Emerald City was based on a small photograph of a sketch that had been done in Germany pre-World War I, which looked like test tubes upside down. Aljean Harmetz, *The Making of The Wizard of Oz [1977]* (Chicago: Chicago Review Press, 2013), p. 215.

[87] DMJM subsequently won additional Titan I squadron contracts, including one in Ellsworth AFB, Rapid City, S.D; Larson AFB, Moses Lake, Wash; Beale AFB, Marysville, CA; and Mountain Home AFB, Mountain Home Idaho.

[88] Iola M. Sayers, "History of the Site Activation Task Force (Lowry)" (US Air Force, March 31, 1958), US Air Force Historical Research Division, Maxwell Air Force Base Archives, Alabama.

training, and fully operational bases that were equal parts defensive and deterring; quite literally, they were stage sets and were described using a language of Hollywood. The contract included the design of both "hardened" facilities that could survive an atomic attack, as well as "Hollywood Hard" test and training facilities that were fully operational, but only hard in appearance. Architects and engineers used the term "Hollywood Hard" to distinguish between truly invulnerable missile facilities and those only hard at the surface, which meant that beneath the ground, the operators in training and testing facilities remained vulnerable. Ballistic Missile Division Colonel Charles Alexander and engineer Fred Ressegieu defined the term in *Missiles and Rockets* in 1959:

> Training bases are built to be as nearly like operational sites as possible, insofar as actual equipment and arrangement are concerned. The term 'Hollywood Hard' has been coined to describe these installations which simulate the 'hard' operational bases, the main differences being that the hard bases are underground and have more massive concrete structures.[89]

Therefore, the ICBM testing and training facilities boasted a new politics of truth by absorbing the rhetoric of the film industry. The "political problem" of the intellectual, as defined by Michel Foucault, required the altering of the political, economic, and institutional structures through which truths were produced. As he suggested:

> The problem is not changing people's consciousness—or what's in their heads—but the political, economic, institutional regime of the production of truth. It's not a matter of emancipating truth from every system of power (which would be a chimera, for truth is already power), but of detaching the power of truth from the forms of hegemony, social, economic, and cultural, within which it operates at the present time.[90]

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[89] Charles B. Alexander and Fred E. Ressegieu, "$550 Million for ICBM Facilities," *Missiles and Rockets*, September 21, 1959.

[90] Michel Foucault, "Truth and Power," in *The Foucault Reader*, ed. Paul Rabinow (New York: Pantheon Books, 1984), p. 74-75.

Therefore, the power of the ICBM as a deterrent system relied on the rhetoric of accumulated experiences in ways that allowed it to be unhinged from material capacity—conveyed through testing and elaborative renderings—such that both "Hollywood Hard" and truly hardened bases could serve the same function and produce the same effects. Both implied immense retaliatory power, and, at least at the surface, indestructibility.

DMJM's contract for the Titan bases initially was comprised of three parts. The first and most immediate included a single-missile Titan prototype test facility—the Operational Silo Test Facility—at Vandenberg Air Force Base in California, near the city of Santa Maria (the city where DMJM got its start) that was constructed before operational bases could be constructed elsewhere.[91] The second part, also at Vandenberg, was a three-missile Training Base Facility. Both the single-launch facility and the three-missile training facility were to be fully operational, but only "Hollywood Hard." The third part of the contract called for the design of a fully operational and truly hardened complex, Squadron No. 1, at Lowry Air Force Base outside of Denver, Colorado, where the Martin Company's manufacturing center for the missile was based.[92] The basic design of both the "Hollywood Hard" and hardened Titan complexes consisted of nearly identical components: an interconnected set of fortified caverns—"silos"—each with a launch elevator and a structural crib on the interior, a "control center,"

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[91] The single-missile facility was intended to be used to test the weapon system, after which it was to be used for training. However, in December of 1960, after a series of tests, a missile fell too quickly back into the silo, rupturing the fuel tanks and destroying the facility beyond repair. Warren E. Greene, *The Development of the SM-68 Titan* (Air Force Systems Command, 1962), p. 98.

[92] Both Vandenberg and Lowry were selected from 200 possible locations due to the strategic location and proximity to manufacturers of missiles and its components. In 1957, the decision to reserve Lowry for the first Titan Squadron was made through a process of elimination, in which each possible site was evaluated by suitability for target coverage, reaction potential, and maximum survival (adequate warning time, dispersal, and concealment). In addition, Lowry was nearby The Martin Company's manufacturing center, which was concurrently developing and manufacturing the missile. "Minutes of the Eighth Meeting, Air Force Ballistic Missiles Committee," February 7, 1957, Air Force Historical Research Division, Maxwell Air Force Base Archives, Alabama.

"powerhouse," "propellent terminals," as well as air ducts and miles of piping to fuel the missile (*Figure 3.18*).[93]

As Tom Vanderbilt has argued in *Survival City,* the silos constituted "the ultimate incarnation of the modernist dictum that buildings were machines; the missile silos, in their earliest incarnation, were disposable: once the missiles were fired, the structure was useless."[94] Silos, such as those used for grain storage, were often celebrated by modernists such as Le Corbusier for the interplay of their geometries with light, but they were not only functionally fit for vertical storage, but also for the vertical firing of a missile, like an upright barrel of a gun.[95] The silos at the "Hollywood Hard" testing and training sites, as well as at the fully hardened operational sites, were similar. Designed as reinforced concrete cylinders forty feet in diameter and 161 feet in depth, the wall thickness of the fully hardened silos was two feet at the bottom, which tapered to thirteen feet-nine inches at the top in order to brace against the high thrust loads of the missile while it launched, while the "Hollywood Hard" silos, including the single-silo Operational Silo Test Facility, included less concrete in the foundation as well as at ground level (*Figure 3.19-3.20*).[96] Additionally, the two silos included different types of doors: in the fully hardened structures, a pair of reinforced concrete silo doors protected the missile from

[93] Kudroff, "The First Titan Hardened Facilities," p. 11. For a comprehensive overview of the construction components, as well as for the launch processes, see: Joseph Gies, "Hell Hole: Launching the Titan Missile," *Wonders of the Modern World: Thirteen Great Achievements of Modern Engineering,* (New York: Thomas Y Crowell Company, 1966), pp. 191-200.

[94] Vanderbilt, *Survival City*, p. 161.

[95] Le Corbusier argued that "Our eyes were made for seeing forms in light; shadow and light reveal forms; cubes, cones, spheres, cylinders, and pyramids are the great primary forms that light reveals well," Le Corbusier, *Toward an Architecture* (Los Angeles, Calif: Getty Research Institute, 2007), p. 102.

[96] For additional construction details, see: "Missile Base Construction," *Western Construction*, (April 1960), pp. 47–52; and "Now--Millions for Missile Bases."

overpressures and nuclear contamination. Inside, both silos included a crib structure that supported the missile itself, a launcher platform, plumbing, and sensing devices (*Figure 3.21*).

DMJM&A was tasked with a number of logistical considerations, such as determining the diameter of the missile silos and how to slowly load the propellant (a petroleum derivative and liquid oxygen) into the missile upon launch command. It was also tasked with defining the shape and thickness of the concrete that would be necessary for protecting the underground structures, and perhaps most importantly, DMJM was required to design the configuration and the distances between the missiles and the control facilities. The organization of the missile bases was similar across both types of complexes, and it was informed by the logic of decentralization.

Theories of urban decentralization were ushered in during the 1950s as a critique to nineteenth-century Chicago School planning, since traditionally concentrated industrial cores of cities would be prime targets in nuclear war; therefore, dispersal was a strategy of civil defense.[97] As historian Reinhold Martin has argued, the dispersal of urban infrastructure into horizontal networks of communication and transportation was both an instrument of civil defense as well as organizational defense that reinforced the military-industrial complex—against the presumed internal disorder that might arise in the aftermath of a potential nuclear attack.[98] Since the organization of a Titan complex would be readily visible from the sky, geographic decentralization was also used as a deterring mechanism. The Air Force first defined the Atlas and Titan squadrons in concentrated clusters of nine missiles on singular sites, in 9x1 complex configurations, because the missiles were required to be in close proximity to a radio antenna

[97] Monteyne, *Fallout Shelter*, p. 10.

[98] Martin, *The Organizational Complex: Architecture, Media, and Corporate Space*, p. 7.

guiding them to their pre-programmed target.[99] Contrary to initial Air Force recommendations in 1958 the 9x1 configuration was problematized, since the entire complex would constitute a single target, subjecting an entire squadron to destruction with only one enemy weapon. Instead, DMJM&A proposed a configuration of nine launchers arranged in a 3x3 self-contained complex, each with three missiles and at three geographically dispersed sites (*Figure 3.22-3.25*). Each complex was separated by twelve to eighteen miles, so if one complex was struck and for some reason could not return fire, there would still be two functional complexes within a squadron.[100] Thus, like Daniel's emphasis on the construction of proofs, the distance between the sites, as well as between the defense and deterrent programs, was of foremost importance and again echoed the nascent multi-firm logics of DMJM&A—an association of multiple firms whose experiences were carefully considered, distanced, and coordinated. Colonel Leonhard described the organization and design of the Titan missile facilities in which the term "military base" could be read just like a "firm":

> It's [a missile base] a special type of animal. When you think of missile bases, you have to get away from the idea of a single contiguous piece of property—a parcel or real estate with a fence around it. The 'base' proper may be just a place to put your shoes—with the actual launching sites as widely separated locations in its vicinity.[101]

The most significant differences between the "Hollywood Hard" and truly hard sites were in the

[99] The subsequent Titan system, the Titan II, was all-inertial rather than all-radiational, and it therefore no longer needed to be clustered in groups of three.

[100] According to DMJM records, DMJM submitted preliminary drawings to the BMD in July 10 indicating a 3x3 configuration rather than an undispersed 9x1 and, according to the AFBMD records, the AFBMD approved this change on July 18, 1958. Squadron 1 and 2, in Colorado, were slightly closer. Max Rosenberg, "USAF Ballistic Missiles 1958-1959" (USAF Historical Division Liaison Office, July 1960), The National Security Archive, The George Washington University. At Lowry, the dispersal distance between the complexes was only six miles, while the Air Force insisted that eighteen miles was optimal. The explanation first provided by the Air Force was that the distance was reduced due to the difficulty of acquiring additional land, but other accounts suggest that the reduced distance was because construction began after the 18-mile standard was set. See: "First Hard Site for Titan I Takes Form," *Missiles and Rockets* (September 1960), pp. 32–33.

[101] "Now--Millions for Missile Bases," pp. 22.

control centers, in which the majority of the operators worked. The control centers included spaces for operations control, communications equipment, and mechanical equipment, and thus they were the nerve centers of each launch complex. Both the control centers and the powerhouses within fully hardened complexes, such as those at Lowry AFB, were designed as reinforced concrete domed structures buried over twenty feet below the ground (*Figure 3.26*)—a type of construction that was rigorously tested for both defense and deterrence by the Air Force and the Office of Civil Defense Mobilization at the Nevada Test Site during the 1950s (*Figure 3.27*).[102] Unlike Daniel's calculus-based method for determining distances, which assumed the availability of data from material tests, domes and cylinders of varying diameters, thicknesses, and materials (aluminum and concrete) were required to be tested at multiple distances to an atomic bomb's detonation point—at seventy-psi, thirty-five-psi, and twenty-psi regions—in order to determine their optimal shapes, materials, thickness, as well as to record their potential damages (*Figure 3.28*).[103] While aluminum domes suffered total destruction, hemispherical dome and cylindrical arch shells were determined to be "well suited for use as blast-resistant structures, and especially desirable for resisting blast loads above fifty-psi overpressure, since

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[102] Domed shelters were designed by the American Machine and Foundry and tested at the Nevada Test Site for the national shelter program and were subjected to the *Priscilla* test in 1957, in which bank vaults, houses, as well as various shelter proposals by American, French and German engineers were tested. The most thoroughly studied test by architectural historians was the Civil Defense Apple-2 shot in May 1955, in which several building types, such as residential houses and electrical substations were tested, and it was nicknamed the "Survival Town." The buildings were populated with mannequins and stocked with everyday necessities, including canned and packaged foods. The results of these building tests were widely circulated in architectural journals. See: Boyd G. Anderson, "Blast Resistant Buildings: How Practical Are They?" *Architectural Record* (December 1952), pp. 173–78; "Fallout Shelters"; "Buildings Can Be Designed to Resist A-Bombs," *Architectural Record* (August 1952), pp. 182–84. For an excellent overview of this history, see: Monteyne, *Fallout Shelter*; Vanderbilt, *Survival City*.

[103] Concrete domes were tested with thicknesses ranging from 6 inches to 24 inches thick, and well as aluminum domes of 1 inch thick, and cylindrical arch shells. The lower limit (35psi) was of greater interest to the OCDM, while the higher limits were of greater interest to the Air Force. See: E. H. Bultmann Jr., T. G. Morrison, and M. R. Johnson, "Full-Scale Field Tests of Dome and Arch Structures, Project 3.6" (Albuquerque, NM: Defense Atomic Support Agency, August 31, 1960).

conventional rectangular structures become large and unwieldy when proportioned to resist these large blast loads."[104]

At the Titan I complexes, the domes of the control centers were designed and constructed with diameters of 100 feet, and they enclosed communication equipment, control and launch consoles, computers, and living quarters for the operators. The domes were constructed of reinforced concrete at fourteen inches thick at the crown, which tapered to twenty-four inches at the foundation and might be interpreted as a Cold War Pantheon of sorts.[105] The powerhouses were similar in their dome construction yet entirely different in function. They included the utilities necessary to sustain each complex without external support for up to two weeks, including diesel engine generators for both operations and launches. The diameters of the powerhouse domes were slightly larger than those of the control centers, and the concrete tapered from ten inches at the top to thirty at their base. Central to the call for hardening, however, was the accounting for impact, and each dome's parts were divided into three zones that corresponded to the varying degrees of shock impact, measured in terms of velocity, acceleration, and displacement, which they were required to withstand: the structural parts and equipment located in Zone A were expected to carry the brunt of the force, such as the concrete shells; Zone B included the cribs within the missile silo that provided a secondary, yet imperative support that held the missiles, and Zone C included components and structures that could flex, such as the interior floors, which were shock-mounted (*Figure 3.29*). [106]

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[104] Ibid., p. 18. Not only did domes inform the design decisions of the Titan complexes, they also became structural guides for the Emergency Operating Centers (EOC) in the 1950s, which the Office of Civil Defense took over and expanded. The EOCs were where civil defense, public defense, public safety, and public works could carry out local and national work during a crisis. Monteyne, *Fallout Shelter*, p. 212.

[105] Kudroff, "The First Titan Hardened Facilities," p. 44.

[106] Ibid., p. 46.

The floors that horizontally bifurcated the domes—in Zone C—of the fully hardened control centers were not physically attached to the external dome shell, and there was a twelve-inch "rattle space" provided between the edges of the second floor and the internal wall of the dome.[107] The second floors were mounted on independent columns connected to spring-beams in the ground floor, which allowed them to flex, much like a curved and multi-layered leaf spring in an automobile's suspension. Additionally, all of the equipment—from electric bulbs to control consoles to power generators to toilets—was mounted on shock absorbers (*Figure 3.30*). In contrast, the control center for the "Hollywood Hard" testing and training facilities at Vandenberg was designed as a single-level rectangular structure with a shallow sloped roof of steel girders, which peaked up slightly at ground level. The walls were only twelve inches thick of concrete, and the interiors included a dropped ceiling with little accounting for the absorption of shock (*Figure 3.31*).

The Scores of Practice

The multi-firm organization of work enabled the various components of the Titan to be designed simultaneously rather than consecutively—a strategy of "concurrency"—that replaced the typical Fordist assembly-line process of architecture design, development, and drawing production. In addition, the designing of the Titan complexes disrupted views of architectural practice as mere social negotiations between architects, clients, engineers, and builders. Without any formal precedents, the design process was necessarily comprised of both social and material negotiations that resulted in copious revisions and adaptations as they were informed by the simultaneous testing of materials and prototypes by many different organizations across the US.

[107] Ibid.

For architects and engineers at DMJM&A, this meant that they were responsible for gathering, updating, and synthesizing the data as it was produced through mathematics and drawing. As Colonel Charles Alexander and engineer Fred Ressegieu explained in an article published in *Missiles and Rockets*:

> The Architect-Engineer's first concern is to accumulate the information necessary for him to proceed. This includes design criteria from the missile designer, design and operational criteria from the Air Force, construction agency design standards, and specific information pertaining to the site, such as soils, topographic and real estate data.[108]

DMJM&A and the Air Force began the process of designing the Titan complexes with only estimated dimensions of the missile, since The Martin Company was developing it while its launch complexes were being designed. Beyond DMJM&A, the number of firms involved in the design presented an even more complex view of practice and negotiations between firms, materials, and technology: the fueling systems were developed independently by Arthur D. Little Co., which resulted in revisions to drawings in order to fit the missile silos once testing was completed; the internal structural cribs and launching elevators for the missile silos were designed by American Machine Foundry (the same company producing concrete domes for the Nevada Test Site); the radar guidance systems by Bell Telephone Labs; the guidance computers by Remington Rand UNIVAC in St. Paul, Minnesota; and the concrete thicknesses and shelter prototypes were determined by the blasts at the Nevada Test Site—all of which required unilateral coordination between DMJM&A and the Air Force.[109]

Finally, the resulting drawings by DMJM&A were recognized in ways not unlike the materials and the machines subjected to performance tests. DMJM&A's labor for the Titan

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[108] Alexander and Ressegieu, "$550 Million for ICBM Facilities," p. 45-46.

[109] Carlson, "Buildings for the Space Age," p. 118.

resulted in hundreds of pages of construction specifications. In total, the Titan I project required nearly 900,000 hours of negotiations, calculations, and drawings by architects and engineers, as well as over 1,200 criteria developed by the Air Force due to the perpetual revisions.[110] The blueprinting bill over the course of the two years of design work was over $200,000, which excluded the printing of final drawings and specifications for bidding for construction. More tellingly, however, and bidding documents were measured like construction materials—like the concrete tested at the Nevada Test Site or poured into the Titan complexes. The drawings, as embodied scores of socio-material negotiations—of copious revisions and sometimes conflicting details—were measured like the 66,000 tons of structural steel used, or 78,000 tons of reinforcing used to construct the Titan complexes: the bidding and specifications drawings produced for a single base weighed 3.5 tons.[111]

Therefore, the military projects in which DMJM was engaged beginning in the 1950s not only helped the firm to establish an international presence, but their scale, complexity, and pace of construction made joint-ventures and multi-firm practices necessary. Beyond the mere responses to capitalist pressures, joint-ventures and ultimately corporate conglomerate structures emerged as a direct result of the desires by global institutions—from Hollywood to the military—to establish new hegemonic orders in simultaneously material and rhetorical means. The structures, as well as the firms that designed them, were challenged to consider both defensive and deterring strategies simultaneously. For architects at DMJM, this meant to determine a point of hegemonic agreement: between economics and material capability; between defense and deterrence; between the core and periphery of architectural practice; and between

[110] Kudroff, "The First Titan Hardened Facilities," p. 46.

[111] Ibid.

the “profit-seeking” subsidiaries and the labor historically associated with architectural drawing. The structure of DMJM, then, was viewed not unlike the military itself, as one part “hard”—epitomized by a political, economic, and material desire to guard the firm against potential downturns in the economy—and one part “Hollywood Hard”—epitomized by an ability to bolster its experiential capacity, through joint-ventures and later through subsidiaries, in order obtain projects ever-increasing in scale, complexity, and global validity.

CHAPTER 4

Indeterminacy: The Architecture of Conglomerates

The historical dependence of American architecture firms on economic markets has compelled them to conform to the organization, scale, and complexity of their clients and corresponding projects. George B. Post's small atelier budded into a bonafide office to support the rapid construction of the Western Union Telegraph Building in New York City during the 1870s; Albert Kahn's office in Detroit boasted standardization akin to the factories it produced immediately before and after both World Wars; and Skidmore Owings and Merrill adopted an anonymous and acronymic brand, "SOM," akin to the corporations for which it designed new headquarters, including IBM, during the 1960s. DMJM was no exception. By the time the firm had marked its ascent to the top rankings of the largest revenue-generating architecture and engineering firms in the late 1950s, the companies listed as the "Biggest Clients" of such firms, measured by the amount of construction they funded annually, were those that had adopted bonafide conglomerate structures, including American Telephone and Telegraph (AT&T), Western Electric, General Motors, Union Carbide, and DuPont.[1] Yet many of these businesses, due to their transitions from corporations to widely diversified corporate conglomerates, demanded new workspaces, laboratories, and offices buildings to support their new economic orders. By the 1960s, conglomerate enterprises, including the microelectronics company Teledyne Systems in Northridge, California and the petrochemical company Union Carbide in Danbury, Connecticut, presented a fundamental challenge to the organizational and aesthetic tendencies of modern architects, since the often hundreds of diverse subsidiaries, as well as the

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[1] Editors of Architectural Forum, *The 1959 FORUM Directory of the 100 Biggest Architects, Contractors, Clients,* Time, Inc., 1959.

unpredictable rates and directions of their future acquisitions or mergers, defied standardization, reproducibility, and homogeneity.

Like many managerial corporations flocking to the suburbs after the 1940s to take advantage of sprawling and pastoral land for managerial control and capitalist expansion, corporate conglomerates similarly began to abandon their centrally-located urban headquarters and move to the suburbs during the 1960s, where abundant land supported horizontal hierarchies, egalitarian pretensions, and omnidirectional development that could not always be planned nor predicted.[2] This chapter reveals how the efficiencies and profitability of these speculative corporate conglomerates depended on architects, who designed their physical infrastructures and enclosures, and it reveals how, at the same time, architects developed new theories of architectural composition that were conditioned by the particularities of their conglomerate clients. While the resulting buildings of many corporate conglomerates designed between the 1960s and 1980s boasted highly reflective, increasingly thin, and hermetic surfaces wrapped by mirror glass or aluminum, new technological and structural possibilities also allowed the volumes of their enclosures to simultaneously protrude, curve, jog, or fold in conformance to the ostensibly changing business forms within. Therefore, the surfaces simultaneously revealed and concealed the economic logics that lay beneath them, which became a defining characteristic of postmodernism. This chapter reveals how the concepts that came to define postmodernism were not only based on broad socio-economic relationships between late capitalism, businesses, and

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[2] On the rise of managerial capitalism and its influences on suburban development, see: Louise A Mozingo, *Pastoral Capitalism A History of Suburban Corporate Landscapes* (Cambridge: MIT Press, 2011).

architecture, but instead on the attunement by architects to the particular structures and practices of conglomerate business.[3]

While histories and theories of architecture have characterized the shift from corporate organization to financial speculation as a testament to the socio-economic and aesthetic formations of late capitalism, they often elide the specific structures of business through which broader economic conditions were made visible, as well as the direct roles and responsibilities that architects held in the process. This chapter traces the work and design theories of architects Cesar Pelli and Anthony Lumsden—both of whom were hired by DMJM in 1964, as Design Director and Assistant respectively, in an effort to bolster the firm's architectural capacity and to bring recognition to the firm as one that was fully engaged with the discipline and discourse of architecture. Prior to the 1960s, DMJM was primarily recognized for its attention to strict budgetary controls, construction efficiency, and the incredible breadth and scale of its projects. However, Pelli and Lumsden produced projects that won numerous design awards, were widely published in architecture journals, and positioned DMJM as a firm not only recognized for its size and revenue, but its designs as well. Upon their hire at DMJM in the 1960s, Pelli and Lumsden were asked to articulate the economic value of design to the firm as a whole, and both architects became fully enmeshed in conglomerate practice—not only by helping to strengthen the economic foundations of DMJM, but also those of their clients: large-scale, corporate conglomerates. More profoundly, this chapter reveals how the term "conglomerate" began to transcend business and fully saturate discourse about form and aesthetics by the 1970s. Not only

[3] Not all buildings of conglomerate companies revealed the affinities of their business practices, however. ITT's 1972 headquarters was located in the Textron Tower in Providence Rhode Island, which was designed by Shreve, Lamb & Harmon in 1969 as a 23-story, reinforced concrete tower with standardized, recessed glass wall. ITT's main headquarters prior, beginning 1961, was at 320 Park Ave, NYC, and Emery Roth & Son's 1965 tower built for ABC.

used to describe the composition of late capitalist corporations, the term expanded to describe the material and spatial ordering of postmodern buildings. Pelli used the term “conglomerate” to describe projects with competing and seemingly divergent geometries, while at the same time, architectural historian and theorist Charles Jencks used the term “conglomerate” to describe the advent of postmodern building enclosures, though underlying each term was an attunement to underlying structures of business.[4]

The Need for Designers at DMJM

Although DMJM was formed as an architects-only partnership in 1946, the contributing economic value of architects to the firm as a whole was ironically called into question by the early 1960s. DMJM’s projects were published primarily in construction, engineering, and military journals, rather than in architecture, and the partners sought to balance the practice by hiring a reputable designer who could procure what they viewed as more traditional “architectural” projects. Citing their heavy role in military work, Phillip Daniel argued: “we didn’t want to be known only as industrial architects.”[5] Moreover, the looming possibility that Cold War tensions could soon ease was coupled with technological advancements that threatened

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[4] For Pelli, see: Cesar Pelli, in “Cesar Pelli,” *Architectural Digest: The AD 100 Architects*, August 15, 1991, p. 179; for Jencks, see: Charles Jencks, *The Story of Post-Modernism: Five Decades of the Ironic, Iconic and Critical in Architecture* (Chichester: Wiley, 2011), p. 54. It is also worth noting the Alison and Peter Smithson developed a theory of “Conglomerate Order,” which they frequently explained through La Grancia di Cuna in Siena, Italy. While the practices of Smithsons’ were radically different from DMJM’s, in their observation of conglomerate order, they position the farmer as a capitalist: “At its simplest, it [Conglomerate Ordering] can be explained through a farm. On a farm, a stone wall between fields pens in but also shelters the sheep in the snow time. Each part of a structure needs to perform and encompass many tasks. In our time, we thought this way of building should be developed. It is nonformal and does not use classic geometry…That’s what conglomerate ordering is: to build it like a farmer when he’s making a decision—‘Well, if I have to do all that work, I also want it to do that and that and that.’ Everything should have multiple uses.” Peter Smithson, cited in Catherine Spellman and Karl Unglaub, eds., *Peter Smithson: Conversations with Students: A Space for Our Generation* (New York: Princeton Architectural Press, 2005), p. 48. For their extended theory, see: Alison Smithson and Peter Smithson, *Italian Thoughts* (Stockholm, Sweden, 1993).

[5] Freedgood, “‘Dimjim’: Architects for the Space Age,” p. 180.

the future role of architects in military work. In order to avoid an over-dependence on military or engineering-dominant work, and thus to prevent an economic downturn for the firm as a whole, the procurement of projects and the organization of work was distributed along professional lines—despite the integrated approach to practice—such that each group (e.g. architecture, engineering) was responsible for its own projects with a corresponding "Director" overseeing its work. This concern for individual accountability was imperative to a multidisciplinary structure, and it became increasingly important when the firm began to acquire others. As one business leader described:

> The issue with firms crawling with M and As [mergers and acquisitions] is how they are trading their shares internally, but also if the architects are ones that are comfortable and enjoy working at a growing corporation, rather than black cape guys who want to do their own thing…They can't wait and be too dependent on others…The architects and engineers have to go and get their own work...[and] make themselves visible.[6]

Commenting on DMJM's position in a 1960 article in *Fortune* magazine, an anonymous California architect argued—citing "many architects" who regard their work in terms of a *profession* rather than a *business*—that DMJM was required to make an economic sacrifice in order to achieve "first-rate architectural design."[7] Yet as a *business*, stripped of tacit professional beliefs ranking art over commerce, DMJM was not necessarily required to make a sacrifice; it merely had to find architects who espoused the established capitalist logic and accepted the unwavering interest in profit by translating economic practices into critical architectural propositions. In other words, they needed to find architects who could both economically contribute to the firm and engage with the architecture community at large.

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[6] Former business executive in discussion with the author, March 1, 2016.

[7] Freedgood, "'Dimjim': Architects for the Space Age," p. 183.

The first idea to bolster architectural work at DMJM missed the mark. DMJM hired architect Stephen Oppenheim as a mid-management Design Director in 1958; his strong aesthetic convictions were intended to produce "sophisticated" architecture that could attract "prestigious" commissions.[8] As a Poland-born graduate of the Ecole des Beaux-Arts, Oppenheim's projects reflected an affinity for sculptural concrete based on his admiration for Pier Luigi Nervi.[9] By the early 1960s, however, Oppenheim departed from DMJM to establish an independent architecture firm in Hollywood, where he specialized in housing and urban policies.[10] In a second attempt, DMJM hired young architects Cesar Pelli and Anthony Lumsden in 1964 as Design Director and Assistant, respectively—both of whom were associates at Eero Saarinen and Associates and its successor office Kevin Roche and John Dinkeloo and Associates. While Saarinen and Pelli worked together on projects including the TWA Terminal at the Kennedy Airport in New York, Lumsden and Dinkeloo worked together on corporate headquarters and laboratories for companies such as IBM and Bell Telephone. Lumsden was the manager of design for the Bell Telephone Laboratories in Holmdel, New Jersey under Roche from 1957-1962, for which they designed an expansive reflective glass curtain wall that was named "The Biggest Mirror Ever" in *Architectural Forum* in 1967.[11] It was precisely this expanse of repetitious mirror glass, as well as the distorted images of the environment that it captured on its screen, that historian Reinhold Martin has described as the aesthetic epitome of a mid-century corporate "organizational

[8] "Daniel, Mann, Johnson & Mendenhall: How Teamwork Has Built a Thriving Architect-Engineer Firm," N. p.

[9] Ibid.

[10] Oppenheim's firm, Stephen G. Oppenheim & Associates, won several government and professional awards for housing innovations. See: "Stephen Oppenheim Given Merit Award." *Los Angeles Times*, October 27, 1968, p. J2.

[11] "The Biggest Mirror Ever," *Architectural Forum,* Vol. 126 (April 1967).

complex."[12] However, upon Pelli and Lumsden's arrival to DMJM, their work began to slowly break free from the constraints of standardized glass facades and their homogenizing effects, and instead toward more flexible, omnidirectional aesthetic possibilities that became associated with late capitalism. While DMJM proved not to be a long-term fit for Pelli, who in 1968 left to work for Victor Gruen Associates across the city and subsequently to form his own office in 1977, Lumsden assumed the position of Director of Design upon Pelli's departure, and he remained at DMJM until 1993. Lumsden's history is, therefore, one of adapting to the conditions set forth by the demands of late capitalist business. Amid a sea of architects who viewed the capacity of the architect as overtly limited by the structure and culture of business during the 1950s and 1960s, including Robert Venturi, Peter Eisenman, and Frank Gehry, among others, Lumsden served as both a piercing exception and exemplar. By 1990, a business executive at DMJM described Lumsden as "unusual," because he emerged as an exceptionally well-regarded designer as well as a "very astute businessman."[13]

During the four years prior to Pelli's departure, he and Lumsden worked together to establish a robust architectural reputation for DMJM by winning design awards that elevated the perception of corporate architecture firms in Los Angeles. In the mid-1960s, for instance, the Sunset International Petroleum Corporation commissioned DMJM to design a mountaintop housing community in Santa Monica, named Sunset Mountain Park, which was designed in 1966 and remained unbuilt, though it received the First Design Award from *Progressive Architecture*

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[12] Martin, *The Organizational Complex: Architecture, Media, and Corporate Space*. As design manager of the Bell Labs project, Lumsden proposed an inverted structural mullion to provide a continuously smooth surface. However, Roche rejected the proposal primarily due to his interest in the ability of vertical mullions to produce surface shadows to reinforce the standardizing effects of the mullions. See: Daniel D. Paul, "The Aesthetics of Efficiency: Contexts and the Early Development of Late-Modern Glass Skin Architecture" (California State University, Northridge, 2004).

[13] Former business executive in discussion with the author, March 1, 2016.

and was featured in a number of international architecture journals (*Figure 4.0*). Their 1971 Worldway Postal Center (*Figure 4.1*), designed and built with a structural system of concrete slabs and columns that were exposed on the exterior yet inset into the wall at the Los Angeles International Airport, won an Honor Award from the AIA of Southern California in 1969 as well as a Gold Medal from the Society of American Registered Architects.[14] In addition, they designed office buildings with smooth mirror glass facades throughout Los Angeles. They still managed to elude the category of "art" altogether, however, though their projects challenged the uniformity of otherwise standardized, rectilinear, and low-cost corporate architecture. California architecture critic Esther McCoy argued that Pelli and Lumsden's projects pushed beyond the standard "kit of parts" that was typical of "the big offices." "The big office," she suggested, "with its relentless flow of large-scale building, is often an agent through which change comes, even though the design comes out of the drawer. When the big offices pause to produce 'art' it is too often an essay into temple making, and the solution in the drawer might have been better for the city."[15] However, with the "tough mind" of Pelli in charge and Lumsden by his side, she argued that DMJM was more sensitive to the tensions of the city, and together they were compelled to "rethink design in terms of post-drawer needs. Commonsense architecture is lifted above dullness and it becomes the means through which the city is refreshed."[16] Thus, not only did Lumsden and Pelli's projects help to bolster DMJM's reputation as a preeminent design firm, but they helped to establish a discourse about architecture in Los Angeles. Lumsden and Pelli were affiliated with two loosely organized and short-lived groups, including the "Silvers"—a

[14] "Worldway Postal Center, Los Angeles International Airport, California, 1968." *Architecture and Urbanism* (June 1985), pp. 44-46.

[15] Esther McCoy, "Planned for Change," *Architectural Forum*, August 1968, p. 106.

[16] Ibid.

group of Los Angeles architects known for the smooth, silver-like mirror glass facades of their buildings, and the "LA Twelve"—a group of twelve Los Angeles architects practicing for twelve years who displayed twelve projects at the Pacific Design Center in 1976. Therefore, even though practices of Pelli and Lumsden were underwritten by a firm growing by mergers and acquisitions, they were listed amongst the ranks of noted Southern California architects including, among others, Craig Ellwood, Ray Kappe, John Lautner, and Frank Gehry.[17]

Designing for Growth: Teledyne Laboratories

Pelli and Lumsden's theories of design influenced and were influenced by corporate conglomeration—not only because DMJM had developed into a conglomerate beneath their feet, but also because many of their clients were conglomerate enterprises, growing by acquiring and merging with subsidiary companies in often completely unrelated industries. One of Pelli and Lumsden's earliest and most revealing projects at DMJM was a laboratory designed in 1966 for the microelectronics and semiconductor conglomerate, Teledyne. Teledyne's mushrooming in the 1960s characterized the proliferation of conglomerates in the US more broadly, including the rise of International Telephone and Telegraph (ITT), Litton Industries, and Textron—each of which followed the leads of early conglomerate companies, including DuPont and General

[17] The Los Angeles group, the "Silvers," emerged as a response to the debate between the neo-Modernist "Whites" and the post-Modernist "Grays," and they were named for the slick silver aesthetic of many of their projects, as highlighted by two conferences at UCLA in 1974 and 1976, respectively titled "Four Days in May," and "Four Days in April." The silvers included DMJM architects Lumsden, Pelli, Frank Dimster of William Pereira's office, Paul Kennon of CRS, Tim Vreeland of AC Martin and former assistant to Louis Kahn, Eugene Kupper, and Craig Hodgetts. See: Charles Jencks, "Silver Architects," *LA Architect*, (June 1976); and Gannon and Branda, *A Confederacy of Heretics*. On Anthony Lumsden's role in particular, see: "The Silvers: Anthony J. Lumsden," *Progressive Architecture*, (October 1976), pp. 70–74; and "Lumsden, A. J., Architect." The "Los Angeles 12" was an exhibition in 1976 at the Cesar Pelli-designed Pacific Design Center, which formed out of a 1974 project by Charles Slert (later an architect at DMJM) and his professor Bernard Zimmerman at Cal Poly Pomona in 1974. The group consisted of: Roland Cote, Daniel Dworsky, Craig Ellwood, Frank Gehry, Ray Kappe, John Lautner, Jerrold Lomax, Anthony Lumsden, Leroy Milly, Cesar Pelli, James Pulliam, and Bernard Zimmerman.

Electric as early as the 1920s, though they had become far more aggressive and focused on the tools of machines, rather than on machines themselves.[18] The production of the tools of practice might also compare to the subsidiaries at DMJM, which focused on the tools of architectural production—including those needed to acquire land (real estate), or to process data in the office (computers). The same year that DMJM incorporated in 1960, Teledyne was established by former Litton Industries executives Henry Singleton and George Kozmetsky, who acquired the stock of three existing microelectronics and control systems companies and their 200 employees.[19] Fueled by the military and aerospace markets into which they lodged their systems technologies in ways not unlike DMJM, Teledyne acquired seven companies in its first two years, and by 1966, it had emerged as a Fortune 500 company with over 5,000 employees.[20] By the end of the decade, the offerings of Teledyne's subsidiaries ranged from microelectronics to dental appliances to insurance, and Singleton described Teledyne as a "living plant": the individual subsidiaries within Teledyne represented different "branches"—each sprouting their own tertiary branches such that "no one business [was] too significant."[21] Singleton's decree of socio-economic equivalency represented a guiding tenant of corporate conglomeration, and it also recalled the founding ideals set forth by DMJM—that each part of the practice, whether engineering or architecture or planning or real estate, was to be viewed as socially and

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[18] See: Max Holland, *When the Machine Stopped: A Cautionary Tale from Industrial America,* (Boston: Harvard Business School Press, 1989); and Lamoreaux, Raff, and Temin, "Beyond Markets and Hierarchies: Toward a New Synthesis of American Business History."

[19] G. A. Roberts and Robert J. McVicker, *Distant Force: A Memoir of the Teledyne Corporation and the Man Who Created It, with an Introduction to Teledyne Technologies* (S.l.: George A. Roberts, 2007), p.18. Perhaps ironically, Teledyne was acquired by Litton Industries in 1994, and then later by Northrop Grumman in 2001. See: "Up to Up to 220 Teledyne Inc. Employees to Lose Jobs: Business: Northridge and Newbury Park facilities are being affected by pending sale of division to Litton Industries," *Los Angeles Times,* December 15, 1994; "Northrop to Trim 500 Jobs, 3 Facilities," *Los Angeles Times,* August 28, 2001.

[20] Ibid.

[21] Roberts and McVicker, *Distant Force*, p. 22.

economically equal. More importantly, however, Singleton's description imposed an inherent limitation on the growth of each branch. From his perspective, it was economically disadvantageous for any single person or business within the conglomerate to become *more* valuable than any other, which was an important and revealing caveat that, at DMJM, would foreshadow the abrupt end of Lumsden's tenure in 1993.

Singleton was an avid architectural philanthropist who commissioned Richard Neutra to design his own modernist glass house in Bel-Air in 1959 and Wallace Neff to design a second sprawling estate in Holmby Hills in 1973—between which he commissioned DMJM to design Teledyne Labs. Sited in a pastoral 36-acre orange grove in Northridge, California, the manufacturing and research lab was completed in 1968, and it included spaces for administration, engineering, and electronics assembly (*Figure 4.2*). The building made a clear departure from Fordist means of production, since it did not include linear industrial assembly lines; instead, it included decentralized microelectronic assembly laboratory spaces. Due to the disparate nature of Teledyne's systems technologies, as well as the unknowable rate and direction of its future acquisitions, Pelli argued that, like the "living plant" Singleton envisaged, the labs "could not be designed as a structure with a static future," since the building would need to account for both flexibility and growth that could not yet be determined. Pelli asserted: "flexibility in architecture relates to the possibilities of change within a given area. Growth has to do with the addition of new areas and functions to existing ones."[22] As a result, the building was described as a dynamic "complex" comprised of "several structures housing different functions," and it was subject to expansion at any phase of its life—even while it was being designed and

[22] "Manufacturing and Research Facility for Teledyne Systems Company" May 7, 1969, p. 6. Pelli Clarke Pelli Architects, Series II Collection, Yale University Library Manuscripts and Archives. New Haven, Connecticut.

constructed. In the complex's site plan, dashed lines extended beyond the building's proposed walls to outline a speculative footprint of an expanded lab, which was labelled as "future" (*Figure 4.3*). These dashed lines were not unlike the dashed lines used in DMJM's own business organizational charts, which represented new forms of immaterial labor, including marketing or real estate. In the Teledyne plan, the dashed-in spaces marked as "future" accounted for a new source of capital—speculation—that had an indirect and ambiguous relationship to the manual labor of microelectronics assembly. Even further, the administration offices were pulled outward from the center of the otherwise linear line of circulation so as to present a sense of horizontal hierarchy, and the building's form quite literally took on the form of an organizational chart transposed onto the ground itself—exposing the hierarchies that were so carefully concealed by the modern corporate towers of the preceding decades. Through its site plan, the planning of conglomerate business was translated into spatial and geographic terms, and Pelli described the "complex" as perpetually incomplete and heterogeneous:

> One of the characteristics of growth or planning for growth is that it is different from what we thought it would be five years ago. To assume that you can add increments of the same thing five years later is unrealistic...[Architects] prefer to think of something 'finished.' When they think of changes it is the changes inside a building…By and large, architects are still designing temples. This is a static view of life, but today we recognize and welcome that life is change. Teledyne is not a building but a complex. Complexes are not homogenous; they are structures faced with problems of growth…It is seldom possible to predetermine growth, and the problem is how to plan for undetermined growth without throwing the architecture away.[23]

The interest in "growth" in terms of material history, according to Sigfried Giedion, indicated an epochal shift away from the determinisms associated with standardization and mechanization, which followed the field of genetics and the possibility of cross-breeding organisms and plants to produce new ones, rather than merely to mass reproduce existing ones. Giedion noted that, while

[23] Cesar Pelli, quoted in McCoy, "Planned for Change," p. 103, 105.

the eighteenth century was responsible for mechanizing the process of genetic hybridization, genetic alteration after the 1930s occurred at an unprecedented rate and at a scale of "gigantic."[24] Conglomerate businessmen and architects, therefore, began to appropriate the language of genetics during the 1960s by re-wiring their own codes of commerce, combining firms to both diversify their offerings and yield entirely new and unique types of profitable organisms.

Indeed, the Teledyne complex was a "living plant" that was described much like an organism ripe for genetic manipulation. The multiple structures were organized around an 800-foot-long linear circulation "spine," which was intended to support expansion and additions. The spine, which included a mezzanine level for visitors, was a concept that Pelli first developed for his senior thesis at the University of Tucumán in Argentina, and he described its function at Teledyne like an old, pedestrian-only city street (*Figure 4.4*).[25] As one critic described, "the complex with a common spine is a system which accommodates widely dissimilar functions…These considerations lead to a design in which a static kind of formal order is replaced by a dynamic order of forms in process."[26] Designed as an initial 165,000 square feet of space with an ability to expand to 400,000 square feet as Teledyne grew, only the circulation spine, mechanical spaces, cafeteria, and main lobby were fixed.[27] Three acute jogs protruded outward from the glass curtain wall, which Lumsden described as "fingers," that functioned on

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[24] Sigfried Giedion, *Mechanization Takes Command: A Contribution to Anonymous History* (New York: Oxford University Press, 1948), p. 247-248.

[25] For more on the history of Pelli's attention to the "spine," see: Paul, "The Aesthetics of Efficiency: Contexts and the Early Development of Late-Modern Glass Skin Architecture," p. 26. For more on the connection of the spine to the street, see: "Manufacturing and Research Facility for Teledyne Systems Company" May 7, 1969, p. 8. Pelli Clarke Pelli Architects, Series II Collection, Yale University Library Manuscripts and Archives. New Haven, Connecticut.

[26] "Plant Design Allows for Change," *Industry Week*, March 25, 1974, 83-91, p. 91.

[27] "Manufacturing and Research Facility for Teledyne Systems Company" May 7, 1969, p. 1.

behalf of the corporate organism as joints for expansion (*Figure 4.5*). In plan, the fingers provided the sprawling complex with a sense of directionality and forward thrust—the kind of economic momentum or "synergy" a conglomerate purportedly obtained by combining firms. The spine rendered Teledyne as a vector, and the complex appeared ready to crawl forward as its fingers waited, ready to latch onto new companies.

The concept of a spine was further detailed in subsequent projects by Pelli and Lumsden, such as a laboratory for yet another government-sponsored project, the Communications Satellite Corporation (COMSAT) in Clarksburg, Maryland in 1968-69, where satellites were developed, tested, and manufactured (*Figure 4.6*). COMSAT was formed in 1962 in response to the federal government's inability to develop communications systems without relying intensely on private companies, such as Bell Laboratories—the company for which Lumsden helped to design a research laboratory prior to moving to DMJM. COMSAT's governing board was comprised of fifteen representatives from private companies as well as the federal government; moreover, half of COMSAT's shares were owned by American Telephone & Telegraph (AT&T), the Radio Corporation of America (RCA), Western Union International, and the International Telephone and Telegraph Company (ITT)—the archetypal conglomerate of the 1960s, known for its acquisitions of nearly three-hundred far-flung companies in a short span of ten years, including Continental Baking, Rayonier Pulp and Paper, and Avis Rent-a-Car.[28] Yet the ability of Pelli and Lumsden to put forth a design for COMSAT that was sensitive to the pragmatic demands of satellite testing and manufacturing, while still bold in its material aspirations, was predicated on

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[28] Paula Kepos and Thomas Derdak, eds., *International Directory of Company Histories*, vol. 11 (Chicago: St. James Press, 1995). For more on ITT's history, see: Thomas S. Burns, *Tales of ITT: An Insider's Report* (Boston: Houghton Mifflin, 1974); Anthony Sampson, *The Sovereign State: The Secret History of ITT* (London: Hodder and Stoughton, 1973).

an unsurprisingly rapid construction timeline—an imposition common to all of DMJM's prior government projects—and DMJM's responding ability to produce drawings swiftly and efficiently. As Pelli described, "they gave it [the commission] to DMJM because DMJM promised that from the moment they were hired they could start construction in five months. And that was why I could propose a very wild design that got approved and went ahead; because they had no choice. It was all run at such a high speed."[29] The circulation and service core of COMSAT, like that of Teledyne, was designed to expand in a clear and anticipated order, and it allowed for future expansions, described as a "Technological Imagery: Turnpike Version" in a 1970s article in *Progressive Architecture* (*Figure 4.7*).[30] For COMSAT, Pelli was able to refine his theories of indeterminacy, and he defined and diagramed "growth" in two ways—determinable and indeterminable—that positioned architecture as the mediating element between speculative finance and material production, or, what Fredric Jameson described as a Marxian encounter of "infrastructure" (land speculation and finance capital) and "superstructure" (aesthetic form).[31] The mechanical and service distribution spaces could be physically extended by means of linear or standardized reproduction along a primary and secondary spine, which constituted "predetermined growth." However, due to the less-predictable number and rate of future company acquisitions, additional spaces were described as "undetermined growth," and the entire structure was described—much like DMJM and later AECOM—as "unfinished" and "open ended" (*Figure 4.8*).

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[29] Cesar Pelli, "COMSAT Laboratories Building," Culture Now: Museum Without Walls, accessed January 6, 2017, http://culturenow.org/entry&permalink=19688&seo=COMSAT-Laboratories-Building_Csar-Pelli.

[30] "Technological Imagery: Turnpike Version," *Progressive Architecture* 51, no. 8 (August 1970), pp. 70–75.

[31] Frederic Jameson, "The Brick and the Balloon: Architecture, Idealism and Land Speculation," *New Left Review*, no. 228 (April 1998), p. 44.

Membranes: A Veil of Post-Modernism

Although Lumsden and Pelli developed a penchant for glass while working with Saarinen and Roche and Dinkeloo, it was not until they arrived at DMJM that they began to push building envelopes, including glass curtain walls, toward increasingly smooth, hermetic, and continuous cladding in an attempt to depart from the socio-technological determinisms and reproducible logics of high modernism. By inverting the mullions, glass was able to wrap around buildings in a manner that shifted the role of the façade from one that could flatten, abstract, and homogenize, to one that, while still hermetic and concealing, could articulate and celebrate the potentially divergent volumes of heterogeneous business within. Lumsden referred to this new possibility of glass enclosures as "membranes" akin to skin. To him, a membrane was a material response to conglomeration and the often-disjointed operational units within them, which he defined as "non-directional," and as

> a surface that modifies the transition from inside to outside… Membrane means light weight non-gravitational enclosure. The functional, constructional and visual implication of this light weight enclosure indicates a radical departure for architecture. The analogy is to skin…This notion is the opposite to the idea of a building as being 'all one thing.'[32]

In other words, membranes helped to celebrate the potentially divergent programs or subsidiaries within a conglomerate, while still uniting them by the very materiality of their single flexible enclosures.[33] While COMSAT was clad in an aluminum shell that rounded the sharp edges of the complex, the front of the Teledyne complex was enclosed by a low-cost glass curtain wall of

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[32] Anthony Lumsden, quoted in: Jeffrey Inaba and Peter Zellner, *Whatever Happened to LA? Architectural and Urban Experiments 1970-1990* (Los Angeles, CA: SCI-Arc, 2005), p. 29.

[33] Michael Franklin Ross, "The Development of an Esthetic System at DMJM," *Architectural Record*, (May 1975), p. 111.

reflective, brown-tinted glass panels that were set within an aluminum mullion system, referred to as a “continuous mullion” to emphasize horizontality over repetitive verticality. The mullion system was stained black-brown to blend with the glass—establishing a unifying system of aesthetic order through which any additions to the building, due to Teledyne’s future subsidiaries, could be reconciled, while still maintaining volumetric recognition by the building’s “fingers.”[34]

As architectural historian Daniel Paul has described, Lumsden and Pelli’s projects slowly pushed glass envelopes with greater sensitivity to a “membrane” condition with each project. For a six-story Federal Aviation Administration building in Hawthorne, California, designed concurrently with Teledyne in 1966 and completed in 1973, nearly the entire volume was wrapped by a smooth mirror glass enclosure that was made possible by inverting the vertical mullions (*Figure 4.9-4.10*). Since technology at the time prohibited the glass membrane from completely rolling around the building’s tightly rounded corners, aluminum was used to cap the building’s transitional edges. For their Century City Medical Plaza tower and adjacent hospital, designed in 1967 and completed in 1969, the entire surface of the rectilinear building—from top to bottom—was enclosed by a smooth, dark gray monochromatic glass facade with similarly reversed mullions, protruding outward only 3/8 inch (9mm), rather than six or eight inches typical of modernist curtain walls (*Figure 4.11*).[35]

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[34] “Manufacturing and Research Facility for Teledyne Systems Company” May 7, 1969. Pelli Clarke Pelli Architects, Series II Collection, Yale University Library Manuscripts and Archives. New Haven, Connecticut. The first Bell Laboratories, designed in 1941, by Voorhees, Walker, Foley & Smith was similarly organized around a circulation spine and the possibility for expansion, but the building was based upon pre-determined, standardized modules of six square feet.

[35] Paul, “The Aesthetics of Efficiency: Contexts and the Early Development of Late-Modern Glass Skin Architecture,” p. 34.

After Pelli departed DMJM in 1968, Lumsden assumed the position of Design Director and continued to push the curvilinear potentialities of glass skins in order to allow them to conform with greater malleability to the diverse programs within the buildings. In addition to a series of mid-rise office buildings in Los Angeles, including DMJM's own office building One Park Plaza, built in 1971, for which mullions were also inverted so that the section depth was inside of the building (*Figure 4.12*). Additionally, he designed one for Century Bank, built in 1972 (*Figure 4.13*), another for Manufacturers' Bank in 1974 (*Figure 4.14*), as well as two unrealized hotels that revealed his affinity for smooth enveloping glass membranes by wrapping them around extruded volumes, including in his proposal for the Lugano Hotel and Convention Center in Switzerland in 1972 and the Beverly Hills Hotel in 1973. For Lugano, he proposed a five-acre hotel overlooking Lake Lugano in Switzerland, which was comprised of horizontal cylindrical extrusions that each corresponded to different programs of the hotel, from private rooms to meetings spaces to recreation facilities (*Figure 4.15-4.1*). While certainly not a pure "conglomerate" in the structure of its business, the varying programs of the proposed hotel were united by an undulating mirror glass membrane that draped continuously over the open-ended extruded volumes, emphasizing the ability of each program to independently expand by extrusion while maintaining a sense of material unity. For the Beverly Hills Hotel, he proposed two schemes—one horizontal and one vertical—that each demonstrated a similar combination of formal extrusion and reflective glass membrane (*Figure 4.17-4.19*). The hotel rooms were enclosed by a rectilinear glass structure, while larger-scale and less permanent functions were organized within the extruded volumes and were enveloped by an undulating roof membrane, terracing from the hotel's lobby to a covered car arrival. Like the responses to the speculative demands and multi-unit composition of Teledyne, Lumsden described the Beverly Hills Hotel as an example of an “aesthetic system combining geometries which respond to the different functions of the building,”[36]

Yet it was the representational power of the facades designed by Pelli and Lumsden, as well as the images reflecting in their mirrors, that most captured the attention of critics, theorists, and historians. Much like the vast emptiness flickering in the expansive mirror of Bell Laboratories, the mirror glass at Teledyne was described as a screen of images, with critics highlighting the shimmering environment reflecting in its surfaces, such as the hues of the blue daytime sky transitioning to the greens of the orange groves and lawns to the gold-pinks of the California sunset, and with the protruding “fingers” reflecting the building back onto itself in an endless self-reflecting feedback loop—a testament to the indeterminacies associated with finance capital.[37] Reyner Banham argued that the Teledyne Labs appeared to revive the ostensible flash of a modernist California Case Study “style,” suggesting that the mirror glass curtain was appropriate to the needs of the business then enclosed, especially since the increasingly thin and inverted structural membranes boasted a “self-image” of high-technology that characterized the microelectronics assembled within.[38]

Yet beyond self-image and representation, Frederic Jameson, Charles Jencks, and, by extension, David Harvey, argued that the smooth, mirror-glass surfaces came to represent the

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[36] Stephen Dobney and Anthony J. Lumsden, eds., *A. J. Lumsden: Selected and Current Works*, Master Architect Series (Mulgrave: Images Publ. Group, 1997), p. 154.

[37] John Pastier, *Cesar Pelli*, Monographs in Contemporary Architecture (New York: Whitney Library of Design, 1980), pp. 26-29.

[38] Upon Banham’s visit to Los Angeles in the 1960s, he noted that, even though Pelli and Lumsden’s design of Teledyne was fit to the specificities of Teledyne, the resulting Lab resuscitated a modernist Case Study style that had appeared to have reached a dead-end. Banham hoped that Teledyne might carry the style through future economic or psychological recessions, noting that it was the “style that nearly didn’t.” Reyner Banham, *Los Angeles: The Architecture of Four Ecologies* (Berkeley: Univ. of California Press, 2009), p. 214-15.

speculative nature of late capitalism and the high-technologies of the post-1960s period.[39] In his *Utopia's Ghost,* architectural historian Reinhold Martin has argued that the proliferation of mirror glass during the 1960s and 1970s and its material ability to produce feedback loops of self-reflection and re-reflection not only represented late capitalism, but belonged to it.[40] Skirting metaphor, Martin suggested that most observers of the smooth, slick, and reflective buildings appeared to be lured into and trapped by the reflections of the mirrored glass surfaces, who expected to see a "global network" of capital laying behind the glass, but who instead found only distorted illusory images of the environment and their own bodies projected onto the surfaces. Martin argued that it was only by looking *at* the mirror—the membrane—that one could peer "into the possible futures and possible pasts that may yet escape the entropy of reflection and rereflection that is approached by postmodernity's self-reflexive feedback loops."[41]

Lumsden understood his own projects, including the glass skins, to be born out of technological possibility, which elevated and pushed to a new extreme the structural and abstracted aspirations of modernism, and he accepted the categorization of his projects by Charles Jencks as "Late-Modern," since "Post-Modern" structures were, according to Jencks, those that, among other things, "doubly-coded" in their ability to engage with systems of communication and speak to multiple audiences simultaneously.[42] While Jencks's distinctions between late- and post-modernism have been well critiqued and are not imperative to this

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[39] For David Harvey, the "mirror" held an ability to produce images, imagery, and imaginary money to deflect attention from contradictory truths. The phrase "economics with mirrors" was used by 1980 Republican presidential contender, John Anderson, to describe Ronald Reagan's economic plan, which purported to simultaneously balance the budget, cut taxes, and increase defense spending. Harvey, *The Condition of Postmodernity*, 1989, pp. 329-335.

[40] Martin, *Utopia's Ghost*, p. 114.

[41] Ibid., p. 114.

[42] Jencks, *Late-Modern Architecture and Other Essays*, p. 6-7.

analysis, he defined Lumsden's projects as "difficult cases," since their "slick" and "smooth" surfaces seemed to provoke meaning beyond Lumsden's economic and technological intentions. He asked: "was the 'slick-tech' aesthetic of the smooth glass facade intentional or a kind of inspired malapropism?"[43] Was the undulating mirror glass of the Beverly Hills Hotel a testament to a "silver aesthetic" that represented Beverly Hills' capital power—even though the city did not have enough money to construct it? Or was Lumsden's use of mirror glass in a proposal for a 1976 bank branch tower, Bumi Daya, in Jakarta, Indonesia a reference to the "silver standard" of banking investment—with an "oil-slick" surface "suggesting a series of meanings without naming them, like symbolic poetry of the nineteenth-century" (*Figure 4.20*)?[44] Yet Lumsden's projects—especially as they related to the particularities of business—represented postmodernity not at the level of language or symbolism, but instead at the level of capitalism. Historians and urban geographers, from Reinhold Martin to Frederic Jameson have used the term postmodernism not as a tool for periodization that attempts to describe a particular style, culture, or aesthetic condition, but instead as a concept through which the aesthetic, cultural, and theoretical responses after the 1960s could be viewed in direct relationship to the economic systems and modes of capital accumulation that produced and were produced by them.[45] For Jameson, it was through the particular relationship between architecture and businesses that postmodernism was made visible:

> Architecture is, however, of all the arts that closest constitutively to the economic, with which, in the form of commissions and land values, it has a virtually unmediated relationship: it will therefore not be surprising to find the extraordinary flowering of the new postmodern architecture grounded in the patronage of multinational business, whose

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[43] Charles Jencks, *Architecture Today* (New York: H.N. Abrams, 1988), p. 67.

[44] Charles Jencks, *Late-Modern Architecture and Other Essays* (New York: Rizzoli, 1980), p. 72.

[45] Frederic Jameson, *Postmodernism, or The Cultural Logic of Late Capitalism,* (Durham: Duke University Press, 1992).

> expansion and development is strictly contemporaneous with it. That these two [postmodern architecture and multinational businesses] new phenomena have an even deeper dialectical interrelationship than the simple one-to-one financing of this or that individual project we will try to suggest later on.[46]

Therefore, Jameson argued that the ability of architecture to mediate between finance and aesthetic was not through the "self-reference," such as the kind imposed by Reyner Banham on Teledyne Labs or by Jencks in his reading of Lumsden's projects: "Jencks first allows us to see the way not to do this: that of thematic self-reference, as when Anthony Lumsden's Branch Bank project in Bumi Daya 'alludes to the silver standard and an area of investment where the bank's money is possibly headed.'"[47] Instead, Jameson argues, one should look to the smooth, increasingly thin glass skins—not for meaning—to understand the relationship between multinational business and material culture. The skin, he argues, citing another of Jencks's descriptions, "decreases the mass and weight while enhancing the volume and contour—the difference between a brick and a balloon."[48] For Jameson, the self-contained mirror cylinders of John Portman's Westin Bonaventure Hotel in Los Angeles best described the postmodern aesthetics of speculative finance, where the mirror glass fully concealed the global economic procedures that both gave it place as well as the social relations contained within.

However, Reinhold Martin has argued that Jameson, like Jencks, appeared to be looking at the images projected on the Bonaventure's surfaces rather than at the surface itself, as he described its mirror glass as "distorted images of everything that surrounds it."[49] For Martin, the

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[46] Frederic Jameson, "Postmodernism, or the Cultural Logic of Late Capitalism," *New Left Review*, no. 146 (July-August 1984), pp. 53-92.

[47] Jameson, "The Brick and the Balloon: Architecture, Idealism and Land Speculation," p. 44. For Jencks's original description, see: Charles Jencks, *The New Moderns: From Late to Neo-Modernism* (New York: Rizzoli, 1990), p. 85.

[48] Ibid.

[49] Jencks, *Late-Modern Architecture and Other Essays*, p. 66.

manifestations of finance capital were most obvious in the acute angles and façade protrusions of corporate headquarters, such as those designed by Phillip Johnson and John Burgee for the Investors Diversified Services Center (1974) in Minneapolis, their Pennzoil Place (1975) in Houston, or their Pittsburgh Plate Glass Place (1984) in Pittsburgh. Martin argued that the proliferation of mirror glass, which was as prominent in Texas during the late 1960s and early 1970s as it was in Southern California, allowed for a slick oil-like mirror surface to produce an especially appropriate aesthetic for Houston-based oil companies, such as Pennzoil, by concealing the underlying meanings of capital and privileging illusion in such a way that helped to produce the phantasm "oil"—itself a composite of objects, mechanisms, and embodied labor.[50] Martin argued that the mirror glass surfaces did not *represent* oil, just as the membrane of Teledyne did not *represent* microelectronics; instead, the glass surfaces helped to produce each object in the form of a Marxian commodity fetish—as objects with special powers—by simultaneously revealing—through extrusions, "fingers," angled edges, or protrusions—and concealing—through smooth reflective surfaces—the economic processes that lay beneath it.[51] To push Martin's point further, however, the membranes of conglomerate buildings, as intended and theorized by Lumsden and Pelli, rendered the *conglomerate* structure of business, and its predilection for indeterminacy—not only the ever-changing products it offered—as a commodity fetish, emboldened by its mystical and immense power over businessmen and architectural thinkers—from Jencks to Jameson to Harvey. This point is made patently clear by examining Martin's own examples through the history of business. The Investors Diversified Services, Inc., for example, was reconfigured after it was acquired by Alleghany Corporation (renamed as

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[50] Martin, *Utopia's Ghost*, p. 99.

[51] Ibid., p. 97.

American Express in 1984) and again after it acquired additional insurance companies during the 1980s; the Pittsburgh Plate Glass Company changed its name in 1968 to PPG Industries, Inc. to reveal its diverse offerings—from house paints to fiber glass to window screening—and the tenants of the Pennzoil Place included not only Pennzoil, which itself was a conglomerate, but Zapata Petroleum, as well as the Pennzoil-owned United Gas Pipeline Company.[52] Moreover, while Martin's critique was based on a careful material history and attention to the specific properties of mirror glass, Lumsden argued that the applicability of a "membrane" condition to speculative finance was not restricted to glass, but instead any material that held an ability to simultaneously conceal and reveal the economic procedures that lay behind them. In contrast, Lumsden argued that "our fundamental interest is not in glass walls nor their lightweight equivalent, although the notion of the skin is very significant in relation to the logic of production…We are interested in developing a system that responds to reality, a design system that is not esoteric with respect to necessary data and sub-systems of the building."[53] Indeed, for Lumsden, a building's "membrane" was not motivated by a material ability to produce images nor was it only applicable to a particular material such as glass. In theory, it could apply to glass (as in the case of Teledyne), aluminum (as in the case of COMSAT), or even water (as explored in subsequent projects).

"Conglomerate" as a Term of Postmodern Order

While the proliferation of conglomerate mergers and acquisitions during the 1960s presented a radical shift in terms of business practice from homogeneous to intensely

[52] Ibid., p. 98.

[53] David Morton, "Anti-Gravitational Mass," *Progressive Architecture*, (July 1976), p. 66.

heterogeneous accumulation, the term "conglomerate" began to surface in several seemingly disparate corners of discourse about architectural form and composition during the late 1970s and 1980, which came to represent the onset of post-modernism. Even though Cesar Pelli had long departed DMJM, the uniting of divergent volumes was described as a conglomerate: for a Ley Student Center expansion project at Rice University in Houston in 1986, which he designed as a series of interlocking geometries organized along a long circulation core, he argued that "all the shapes are, in a way, archetypal…cubes, prisms, pyramids—joined together in a dynamic conglomerate" (*Figure 4.21*).[54] Additionally, Charles Jencks used the term "conglomerate" to describe postmodern architecture. On the cover of his widely-cited first and second editions of *The Language of Post-Modern Architecture* in 1977, which was published while he was a visiting professor of architecture at UCLA where Lumsden was also teaching design, he centered a photograph of Minoru Takeyama's 1970 Ni-Ban-Kahn ("Building Number Two") in the Shinjuku ward of Tokyo, which he described as a "conglomerate" (*Figure 4.22*).[55] Jencks described the building's vivid rejection of homogeneity to highlight instead the "functional differences" of its interlocking geometries, which were grouped around an exceptionally narrow vertical circulation core. Like Teledyne, however, the remaining volumes of Ni-Ban-Kahn were the results of functional indeterminacy. Designed in only one month and under immense construction pressure, Takeyama posed a guiding question: "How far am I justified in giving a relationship interpretation to forms [*sic*], and how much indefiniteness may I allow to invade the

[54] Cesar Pelli, in "Cesar Pelli," *Architectural Digest: The AD 100 Architects*, August 15, 1991, p. 179.

[55] The Ni-Ban-Kahn was built nearby its sister, Ichi-Ban-Kahn (Building Number One), which were both commissioned by the same client, though unlike the Ni-Ban-Kahn, it was entirely rented rather than divvied up amongst owners and varying functions. For at least one use of the "conglomerate," see: Charles Jencks, *The Story of Post-Modernism: Five Decades of the Ironic, Iconic and Critical in Architecture* (Chichester: Wiley, 2011).

nature of architectural expression?"[56] Comprised of independently owned commercial spaces, the Ni-Ban-Kahn was subjected to perennial flux in tune with the demands of the rapidly changing urban economy immediately surrounding it. The building included a series of third-floor bars designed by Takeyama; a fourth-floor restaurant designed by Kiso Design Office with a gambling den by Takeyama; fifth and sixth-floor clubs designed by The Uchida Design Office; and finally, a seventh-floor sauna designed by Takeyama (*Figure 4.23*).[57]

Despite the spatial, functional, and material contrasts between Teledyne and the Ni-Ban-Kahn, the two projects were united by the rhetoric of their tailored enclosures. The mediating element between the interior and exterior, according to Takeyama, as well as between the independent businesses and the whole, was a thin and independent "membrane." To Takeyama, the "membrane" was not the concrete wall of the building itself, but rather the thin layer of "plastic paint" sprayed onto it by hand—of supergraphics, signs, and patterns, such as a bullseye that was painted in red and white to suggest industrial code, designed by artist Kiyoshi Awazu that caught Jencks's initial attention.[58] In a 1970 article titled "The Reinstatement of the Film Membrane," Takeyama argued that the building's membrane functioned as "an extremely visible boundary between interior and exterior and as a tangible object invisibly establishing relations with a perception of existence."[59] In other words, the membrane for Takeyama, much like for Lumsden and Pelli, was responsible for both celebrating the independent volumes as well as

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[56] Minoru Takeyama, "The Reinstatement of the Film Membrane," *The Japan Architect* 45, no. 8–166 (August 1970), p. 70.

[57] Minoru Takeyama, "Omni-Rental-Stores: Ni-Ban-Kahn," *The Japan Architect* 45, no. 8–166 (August 1970), p. 65.

[58] Charles Jencks, *The Language of Post-Modern Architecture* (New York: Rizzoli, 1977), p. 54.

[59] Takeyama, "The Reinstatement of the Film Membrane," p. 70.

unifying them by its material presence. "I made a special form with a special image by painting the building," he argued, "hoping that it would continue changing its image and accommodate every sort of image possible—like multifaceted modern art—but still keep a certain constant form based on a different image."[60]

In addition to the layer of paint, a large section of the Ni-Ban-Kahn was enclosed by long vertical panels of mirror glass that fronted the street, reflecting the sky and the opposing urban streetscape. As the neighborhood transformed from a predominantly residential area to a vibrant nighttime commercial center, the painted membrane and the urban images reflecting in the mirror glass changed in tune with the building's changing functions. While the mirror glass endured due to its material ability to absorb—or, better, to reflect—"every sort of image possible," the graphics were repainted, and Jencks was obliged to publish a revised edition of his book (*Figure 4.24*). However, Jencks's insistence on documenting the building as a static sequence of images undermined the very forces of indeterminacy and the contingency upon which a conglomerate was based. While he drew special attention to the graphical heterogeneity of Ni-Ban-Kahn as evidence of Robert Venturi's concept of architectural contradiction and "difficult whole," his breaking down of the building into constituent formal parts in order to interrogate the graphical meaning of the facade overlooked the specific financial conditions compelling such a "conglomerate," as well as its dependence upon architecture to define it as such.[61] While this point does not, on the contrary, suggest that the building was reducible merely to the economic forces that lay beneath it, it does suggest that the business logic of

[60] Minoru Takeyama, quoted in: Paul J. Armstrong and Jeffrey Poss, "Talking Takeyamese: An Interview with Minoru Takeyama," *Reflections*, no. 8 (1991), p. 44.

[61] Jencks, *The Story of Post-Modernism*, pp. 52-54.

conglomeration, which were made visible by architects such as Takeyama and Lumsden, were paramount in the identification of post-modern architecture. The Ni-Ban-Kahn and the businesses within it were, like Teledyne and COMSAT, driven by economic necessity: they were located in an area with high volumes of pedestrian traffic, and the fourteen individual bars were united with leisure spaces in order to compete with the nearly 20,000 bars and clubs, as well as the 50,000 coffee shops and small restaurants in the surrounding neighborhood.[62]

Folding into Practice: The Skin of the Architect

The design rhetoric associated with conglomerates directly informed Lumsden's views about the role and value of the architect at DMJM. Lumsden's ability to make visible the economic value of design by identifying sites of material contingency enabled him to safeguard his role in the process of architectural production, especially as architects were being threatened by technology and mass production.[63] Akin to the membranes knitting together the volumes of Teledyne Labs or those proposed to envelop the Beverly Hills and Lugano hotels, Lumsden was referred to as a spokesman of design—responsible for "disciplinary interfacing" between the multiple divisions of the office and for communicating the role and value of systems processes to other architects.[64] For the architects working beneath him, Lumsden insisted that DMJM was not

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[62] "High Rise Fun Palaces," *Design Journal* (1986), pp. 59–63.

[63] Even with Lumsden at the helm, many architects left soon after they were hired due to inherent cultural incompatibilities associated with the demands of a commercially motivated practice. In 1978, for example, DMJM acquired New Orleans architecture and engineering firm Curtis and Davis. Davis assumed a position as Senior Vice President of DMJM and remained based in New Orleans at a newly named DMJM Curtis & Davis. Yet Davis left after ten years, arguing: "It was a very pleasant but not terribly challenging experience for me. For ten years with DMJM I quite candidly was paid handsomely for a minimum amount of productive work, and as soon as I reached the ten-year period which permitted me to be tenured, I resigned from the firm and received the funds which I had earned through their very generous retirement plan." Arthur Q. Davis, *It Happened by Design: The Life and Work of Arthur Q. Davis* (Jackson, MS: University of Mississippi Press, 2009), p. 56.

[64] "A Summation of Parts: Profile: Daniel, Mann, Johnson and Mendenhall (DMJM)," *Progressive Architecture*, (June 1972), p. 76.

compatible with a "star system" of architects—a system, he argued, that privileged *a priori* design decisions that promoted an attitude of withdrawal from the immediate processes and the tools of architectural work, such as the economic, technological, or environmental underpinnings of a project.[65] Avoiding such a system by associating it with Albert Camus's 1947 novel, *The Plague,* he asserted that

> DMJM does not allow saints on the staff. Even if they are counting money instead of peas. Neither as an attitude for the profession nor in buildings as a product is withdrawal a possible position for a contributing design firm.[66]

Lumsden argued that architects were stuck between two procrustean positions due to internalized, yet polarized beliefs: "architecture is art" and "form follows function." While the former, he suggested, bypassed the functional and performance criteria of a project to impose *a priori* aesthetics, the latter similarly revealed a reductivist bias that reduced a building's function to hyper-efficient "minimalist boxes."[67] Therefore, Lumsden challenged architects to guard against historically constructed "preconceptions" so that buildings were not "controlled by biases that exclude important performance criteria."[68] Not unlike Phillip Daniel's call for mathematics

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[65] Ibid.

[66] "Profile: Daniel, Mann, Johnson and Mendenhall: A Summation of Parts," p. 76.

[67] Anthony J. Lumsden, "Preconception Analysis," *Space Design*, no. 9311 (November 1993): 6–11. p. 10. The concern of "preconception" in architecture is by no means new. Historically, the concern of preconception has been linked to "style," when, at the turn of the 20th century, for example, Louis Sullivan's argued that a "man's preconception always governs unless he possesses genuine culture…For his knowledge, such as it is, is ready-made, precisely as he believes architecture to be ready-made." Louis H. Sullivan, "On the Historic Styles [1901]," in *Architecture in America: A Battle of Styles*, ed. William A. Coles and Henry H. Reed (New York: Appleton-Century-Crofts, Inc, 1961), pp. 46–47.

[68] Lumsden, "Preconception Analysis," p. 6. These ideas were initially developed by Lumsden during the 1970s, as cited in public lectures and in interviews in *Progressive Architecture* (1972). Lumsden pointed to the underlying patterns of voids in the facades of buildings, such as those surrounding the Piazza San Marco in Venice, Italy, including the 12th century Byzantine Basilica, the 14th Century Gothic Doge's Palace, and the 16th century Renaissance Library. He suggested that each of the building's organizational systems, as revealed by the rhythm of voids in their facades, were similar despite their drastically dissimilar construction dates and motives.

in order to validate design decisions for the US military during the 1960s, Lumsden suggested that architects could employ an "analytical phase" to break down biases by testing their ideas against the "limits" of the present: of construction costs, environmental determinants, and occupants' responses to a project.[69]

Lumsden used various species of birds to illustrate his description of the architect's role and the productive capability of architecture to adapt (*Figure 4.25*). Despite their varying visual appearances and corresponding species type, he argued that birds were comprised of analogous skeletal systems and body parts, including beaks, wings, eyes, skeleton, heart, lungs, etc. and that their visual appearances were produced by adaptations to "environmental conditions." Despite Lumsden's reluctance to impose solutions that liberated architects from the determinisms often associated with high modernist architects, planners, and developers, there remained a curiously clear formal and material consistency that knitted together his own projects that could be characterized by a sensitivity to the structures and possibilities of late capitalism.[70]

Lumsden's call to guard against preconceptions and predispositions was founded on a belief that it was indeed possible for an architect to be cognizant of his or her own biases—a position widely debated amongst social theorists during the 1970s and 1980s.[71] Lumsden was not suggesting, however, that architects at DMJM should rid of their preconceptions and subdue

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[69] Ross, "The Development of an Esthetic System at DMJM," p. 112.

[70] This reluctance of architects to impose solutions has been noted by David Harvey: Harvey, *The Condition of Postmodernity*, (1989), p. 76.

[71] Cultural sociologist Anthony Giddens argued that subjects were at least "partially knowing" and could reflect on their own circumstances, while other social theorists, such as Pierre Bourdieu, Michel Foucault, and Michel de Certeau, argued that subjects were largely unaware of the deeply internalized dispositions structuring their actions. See: Giddens, *Central Problems in Social Theory: Action, Structure, and Contradiction in Social Analysis.* (Berkeley: University of California Press., 1979). For a concise historical overview of these varying positions, see: Ortner, *Anthropology and Social Theory*, pp. 1-18.

their dispositions altogether, rather he charged architects to prevent the rote translation of them into practice. According to theories of practice emerging at the time, such as those by sociologist Pierre Bourdieu and his important concept of "habitus," history and culture were thought to be written into the body as a system of acquired dispositions, which functioned as "categories of perception and assessment," "classificatory principles," and the "organizing principles of action."[72] In his original French text, however, Bourdieu used the verb *incarner* to describe the way in which culture was quite literally inscribed into the body, or in direct translation, "into the flesh." To guard against preconceptions as Lumsden suggested—and, thus, one's own habitus—therefore meant to form an impermeable barrier between the flesh of the body and the environment. Thus, the skin, as both a protective and deflective membrane of contingency and vulnerability between the flesh and the environment, united the conglomerate and the architect in terms of practice—each with skin capable of conforming to the variegated and heterogeneous distensions of flesh and its uneven layers of accumulated history, experience, and dispositions over time.

The identification of the skin as a layer of contingency helped to safeguard architects within the process of building production—especially as technology and mechanization continued to threaten their role. In a brief section within his *Mechanization Takes Command,* Sigfried Giedion described the skin as the material that posed the greatest resistance to mechanization during the nineteenth century. He described the efforts to mechanize the de-skinning process of animals in slaughterhouses—the separation of the skin from the flesh—by noting that the skin of animals, such as pigs, presented the greatest drag on the process. Unlike easily reproducible industrial materials, the skin was organically irreducible due to its

[72] Bourdieu, *Outline of a Theory of Practice*, p. 13.

environmental accumulations of dirt, hair, and slime, and its inherent fragility rendered it incapable of mechanical separation. This confrontation between organic matter and the machine, therefore, rendered the hand of the human operator within the slaughterhouse indispensable. In comparable terms, Lumsden's insistence on the architect's ability to absorb—albeit, only as deeply as the skin—the localized and environmental conditions of a project directly correlated to the skin of conglomerate organisms: the contingencies of both helped to secure the architect's hand in the designing of buildings at DMJM and to reveal the value of architects in late capitalism.[73]

The Tillman Wastewater Reclamation Plant

Lumsden argued that his ideas about architectural manifested most clearly in a wastewater treatment plant that was designed during the 1970s and constructed in 1984, where the distinction between infrastructure and architecture collapsed entirely, and where the economic value of his design work to DMJM was made visible. By the 1970s, the rhetoric of fragmentation that had characterized the corporate conglomerate was used to characterize the city of Los Angeles, as well—a city hooked on growth and disjointed beyond measure by private pursuits of profit. Edward Soja argued that the fragmented means of production under post-Fordism, epitomized by sub-contracting, joint-ventures, and conglomeration, characterized the

[73] This sentiment was also shared by architects working at other diversified architectural corporations in which architects were tasked to reveal the inherent economic value of their work after the 1960s as well. In Texas, for example, at Caudill, Rowlett, Scott (CRS), then President and CEO Paul Kennon, who was formerly a colleague of Lumden's and Pelli's at Saarinen's and then Roche and Dinkeloo's office before joining CRS in 1964, argued that, "First, a designer has to be able to free the intuition and bring basic intellectual capacities to bear on that freed-up, innate and instinctive knowledge…Second, a designer must be committed to the design realities of the situation—context, time, money, program…The ability to suspend judgement while searching for cause and effect relationships in seeking a design direction will allow the key influences to emerge and the design intentions to be given form." Paul Kennon, in "CRS: Design in a Process-Oriented Firm," *Space Design*, (March 1980), pp. 22–23.

postmodern city in general;[74] Frederic Jameson described Los Angeles as a "postmodern hyperspace" of bodies unhinged from their surroundings;[75] and Robert Fogelson described Los Angeles as "fragmented" in his *The Fragmented Metropolis*, published at the end of the 1960s.[76] However, disparate growth in Los Angeles, including northward geographical development and rapid population influxes, presented debilitating overcapacity for the city's existing infrastructure, including its transportation systems and wastewater distribution facilities (*Figure 4.26-4.28*). Akin to corporate expansion, urban growth meant that a city could fuel its economic base by increasing and geographically diversifying development. However, during the 1970s, developers were advised that building permits would no longer be approved due to dangerous overcapacity of the city's wastewater infrastructure, and black-out zones barring all new construction and development were mapped onto large swaths of the city (*Figure 4.29*).[77]

The construction of a secondary water reclamation plant north of the city, the Sepulveda (later named the Donald C. Tillman) Wastewater Reclamation Plant, was proposed to relieve the impending infrastructural strain.[78] City residents were fiercely opposed to the idea of a rapidly expanding city, and consequently, the LA Cultural Affairs Commission became more intimately

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[74] Edward W. Soja, *Postmodern Geographies: The Reassertion of Space in Critical Social Theory* (London; New York: Verso, 1989), p. 185.

[75] Frederic Jameson, *Postmodernism, or The Cultural Logic of Late Capitalism,* (Durham: Duke University Press, 1992), p. 44.

[76] Robert M. Fogelson, *The Fragmented Metropolis: Los Angeles, 1850-1930* (Cambridge: Harvard University Press, 1967). While Fogelson's focus was on early twentieth-century Los Angeles, geographers and historians have noted that fragmentation reached a new intensity during the late twentieth-century. See Robert Fishman, "Forward" in *The Fragmented Metropolis: Los Angeles, 1850-1930,* 2nd. Ed. (Berkeley; Los Angeles; London: University of California Press, 1993).

[77] Letter from The Industrial Association of the San Fernando Valley to Senator Alan Cranston, October 18, 1977. California State University Northridge Special Collections, Northridge, CA.

[78] Los Angeles City Planning Department, "Action of the City Planning Commission," June 3, 1971, p. 1. City of Los Angeles Planning Records.

involved in approving public infrastructure proposals, approving only those that purported to be "honest" to the activities within them.[79] Design standards for public works facilities required design and construction costs to be as low as possible, and in order for such facilities to be constructed, they were required to be out of view from city residents. City Engineer Donald C. Tillman argued that the approval of the wastewater plant would hinge on its ability to educate the public about the processes of wastewater treatment; without education, he thought, people would not embrace nor accept urban growth.[80] Tillman suggested that the wastewater plant would need to be designed by an architect, rather than an engineer, since it was to "consider the public."[81] As a compromise with neighboring residents, the approval of the plan was contingent upon a Japanese garden that would cover one-third of the site as a "buffer zone," concealing the wastewater treatment process while demonstrating the harmlessness and environmental uses of treated water.[82] More tellingly, however, the lease between the LA Board of Public Works and the US Army Corps of Engineers, who owned the land, mandated that the garden be developed at the same time as the plant and to remain relative in size as the plant expanded in the future, to ensure that urban growth be concealed—even though the garden was not functionally necessary

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[79] Leon Whiteson, "Innovative Designs Can Enliven Even Those Difficult Buildings," *Los Angeles Times*, January 2, 1989. For an overview of the opposition, see: Doug Smith, "Regional Water Authority Collides with Growth of Metropolitan Area," *Los Angeles Times*, January 27, 1977, p. WS14.

[80] As part of Tillman's initial plan, the idea of educating the public was premised on reclaiming and reusing the treated water domestically. A dual pipe system was conceptualized, in which one pipe would carry water to residences to be used for grey-water matters, such as toilets, while one pipe could be used to carry potable water. However, disagreement about where funds might come from to pay for an additional set of piping prevented it from becoming a widespread reality. Landscape architect in discussion with the author, May 10, 2017.

[81] Ibid.

[82] Ironically, however, since the garden was not a primary functional necessity for the treatment plant, federal funds provided to construct the treatment plant were not to cover the $3.5 million garden itself. Los Angeles City Planning Department, "Action of the City Planning Commission," June 3, 1971, p. 6. Tillman Wastewater Reclamation Plant Archives, Van Nuys, CA.

for the reclamation process and federal funds could not be used to construct it.[83] As a result, Lumsden was selected in the early 1970s, though it was not constructed until the 1980s and completed in 1984 due to seven years of legal sparring with the federal government over the release of funding.[84]

Set within a Japanese Garden, the wastewater plant was intended to serve 400,000 people, and it reclaimed 40 million gallons of water per day with a maximum potential of processing 85 million gallons, or twenty-four percent of the city's wastewater (*Figure 4.30*).[85] The design of the nearly seven-acre garden was based on eighteenth-century wet strolling gardens, or *Chisen-Kaiyu shiki*, and it was designed by landscape architect Koichi Kawana, whose dossier of Japanese gardens included the botanical gardens at the Los Angeles County Museum of Art and at San Diego's Balboa Park (*Figure 4.31*). It was comprised of three sequential parts: a dry Zen meditation garden, a Chisen or "wet-strolling" garden, and a Shoin Building with a tatami mat teahouse and tea garden. As part of Tillman's plan, large pools of

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[83] "Department of the Army, Lease: Flood Control Property, Sepulveda Floor Control Basin, Los Angeles County, California," 1972, p. 2. Tillman Wastewater Reclamation Plant Archives, Van Nuys, CA.

[84] In 1972, the Federal EPA passed a Marine Protection, Research, and Sanctuaries Act (MPRSA) policy that implemented a "no growth policy," mandating that no city dispel sewage into the ocean. For Los Angeles, this meant that the city's primary treatment center, Hyperion, was required to be upgraded before the release of funds to construct a new Sepulveda (Tillman) Wastewater Reclamation Plant. Prior to 1925, raw sewage in Los Angeles was dumped directly into the ocean; after the 1920s, the City began to screen the sewage to protect the beaches. By the 1950s, the Hyperion Plan began to treat the water, though a blend of primary and secondary effluent was still discharged into the ocean through a five-mile-long discharge channel until the 1980s, in violation of the EPA's 1972 policy. The first installment of funds for the Tillman plant, in the amount of $66.9 million, was finally released in 1980, after severe pressure from California Senators, Governor Edmund Brown, and Los Angeles Mayor Tom Bradley. See: George F. Moody to Paul De Falco, "Environmental Assessment of Sepulveda Wastewater Reclamation Plant," April 1, 1980. Gov. Edmund G. Brown, Jr. to Douglas M. Costle, July 24, 1978. "LA Gets $66.9 Million for Sewage Plant: Facility Will Be Stage in Move to End Sludge Dumping in Ocean," *Los Angeles Times*, July 26, 1980. U.S. Environmental Protection Agency to City of Los Angeles, "Grant Agreement," August 5, 1980. All documents from: California State University, Northridge Archives and Special Collections. Northridge, CA.

[85] Dobney and Lumsden, *A. J. Lumsden*, p. 104.

water and waterfalls swirled throughout the gardens with fish and wildlife to demonstrate alternative, yet safe uses of reclaimed water (*Figure 4.32*).

Fascinated by the ways in which wastewater flowed from one treatment process to the next, much like the ways in which subsidiary companies dipped into and out of a conglomerate, Lumsden asked: "Do you disguise, say, a sewage treatment plant's function by prettying it up with fake mansard roofs and roses 'round the door? Or do you take the more sophisticated route of developing a design that honestly expresses what goes on inside, and find a way to turn that action into interesting architecture?"[86] As one architect working under Lumsden described:

> Over time, he [Lumsden] considered projects like Tillman as the purest of architectural projects, and it was a challenge to what other people considered "architecture"…Most people thought that designers just designed the exterior, the program, the floor plans, and make the building look nice. But Tony saw a project like Tillman as the ultimate expression of architects solving the problem of an integrated whole. Basically, shit comes in one end, and clean water comes out the other end…He understood how each part of the process worked, and only then could he develop an aesthetic system to symbolize and express how the process of sewage treatment worked.[87]

Indeed, Lumsden produced drawings and diagrams that distilled architecture to a stream of waterflow, from its input as sewage to its output as reclaimed water (*Figure 4.33*).

The plant was, like Teledyne Labs, a complex, and it included an administration building and laboratories, as well as a series of processing tanks and channels that reclaimed and recycled wastewater (*Figure 4.34*). Lumsden designed the administration building, the blower building, and the maintenance building, while engineers designed the tanks and the treatment process immediately behind it. The concrete administration building also functioned as a viewing center for the public, with a rounded protrusion of mirror glass that rolled to the ground-level and

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[86] Whiteson, "Innovative Designs Can Enliven Even Those Difficult Buildings." Also see: "Design Frills Dominate L.A. Sewage Plant: Effluent Eyed for Irrigation Use," *Engineering News-Record*, June 14, 1984, p. 26–27.

[87] Former architect in discussion with the author, February 2015.

fronted the garden by dipping down to touch the water (*Figure 4.35*). While the flat east façade faced the treatment plant to the rear, a non-load-bearing aluminum and glass membrane wrapped around the structural core, cascading over the building's bare bones like the facility's water-reclaiming activity (*Figure 4.36*). Lumsden described the project as the clearest manifestation of his theory: an extruded building that prioritized the building's section for future expansion of the city, which immediately recalled the conglomerate rhetoric of Teledyne: "A major benefit of this aesthetic type is that it allows the front and sides of buildings to be different thus relatable to each façade's particular adjacencies and environment. This is essential in any multi-building complex such as a university campus or urban context."[88] Moreover, critic Esther McCoy described the Tillman plant by connecting it back to the human body, drawing attention to the membrane that held it together—this time not only the rolling glass nor metal skin, but the water flowing through, beneath, inside, and around it, which Lumsden described as calm, smooth, bubbling, swirling, splashing, tumbling, turbulent, and, like glass, reflecting colors of violet, green, grey, silver, and white. McCoy wrote: "Its functions are as numerous and varied as those of the human body—from influent control through sludge disposal. Here it is the water rather than a glass membrane which knits the elements together…The administration building rides over the water and the high interior spaces of the visitor's centre face it" (*Figure 4.37*).[89]

As the water rippled through the site, through and over the buildings, its reflective authority diverted both visitors' and critics' attention to the hues and swirling images of the garden and sky reflecting in the building's mirrors and water, concealing the economic processes

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[88] "Design Frills Dominate L.A. Sewage Plant: Effluent Eyed for Irrigation Use," *Engineering News-Record* (June 1984), p. 11.

[89] Esther McCoy, "Post-Mies: Architetture Di Anthony J. Lumsden," *Domus*, no. 552 (November 1975), p. 5.

of urban growth gurgling, churning, and filtering immediately behind it (*Figure 4.38*). At the same time, however, Lumsden made legible, at least at the surface, the wastewater treatment processes to the public. The facility featured tall viewing towers that extended from the administration building and provided visitors with a sense of visual and corporeal control over the processes beneath them, enabling them to climb above both the gardens and the treatment chambers. In plan, the towers reached in both directions: from the administration building, one long arm extended a viewing tower southward, out and over the vast and pungent treatment process behind the administration building, while another arm extended to the east, with views out to the gardens below.[90] In a secondary light, the administration building served as a diagram for Lumsden's own positionality within DMJM. He was centered within a sea of equal, yet distinct departments, with one arm extending back to engineering, and another reaching forward to meet the public as they stroll through the gardens—lured into and distracted by the illusory images swirling in the water and reflecting in the rolling glass membrane.

The Limitation of the Individual

By the time that Ashland Oil Company acquired DMJM in 1984, Lumsden had established a substantial architectural name for DMJM. However, of the projects and skills that Ashland Oil deemed economically advantageous to their own portfolio of diversification, it was DMJM's architectural projects and design capabilities that were described most frequently in Ashland's Annual Report to shareholders, citing DMJM as a "consistently ranked leading design firm…with an international reputation for outstanding design, technological advances, strong

[90] While the viewing towers purported to reveal the processes of wastewater treatment to the public, the viewing towers at the Tillman plant contradicted the historical means of viewing Japanese gardens, which were traditionally meant to be viewed from eye-level.

project management, and strict cost and schedule control."[91] In Ashland's 1984 Annual Report, the economic value of Lumsden's efforts was most revealed. The Tillman wastewater plant was broadcasted as an infrastructural landmark for Los Angeles, not because of its material rigor or sophisticated design; rather, because it was capable of treating "40 million gallons of water per day for irrigation and recreation uses in California's San Fernando Valley" (*Figure 4.39*).[92] However, as Ashland withdrew from the engineering business in 1990, selling a majority interest in Ashland Technology Corporation back to its own employees in an employee-led buyback that formed AECOM Technology Corporation, Lumsden contributed one of the largest personal investments.[93] Yet while DMJM continued to operate under the AECOM name until 2007, when the company became publicly listed as a single corporate name, Lumsden's power was called into question during the early 1990s. His elevated agency began to challenge the logic of the conglomerate, which, to recall the theories of Teledyne's Henry Singleton, was predicated on social and economic equivalency, which meant that no one part could be more significant than another. The desire to hire additional well-established architects in 1993 and 1994 at DMJM began to overshadow and fracture the individual name that Lumsden had defined and defended. In 1994, DMJM merged with Los Angeles architecture firm Keating Mann Jernigan Rottet —a group of architects who joined together after meeting while working at Skidmore Owings & Merrill's Houston office during the 1980s and who worked "as a team rather than follow[ed]

[91] Ashland Oil Company, *Annual Report* (Ashland, KY: Ashland Oil Company, 1984), p. 28.

[92] Ibid., p. 28.

[93] Ashland Oil Company, *Annual Report* (1990), p. 4.

established hierarchy models result[ing] from both experience and friendship."[94] DMJM additionally hired Robert Newsom—an architect at Dworsky Associates who would rise to Vice President at AECOM. Amid these impending changes, Lumsden was abruptly asked to leave in 1993, the moment he turned 65—the maximum age allowable as established by DMJM's *Standard Practices Manual* in the 1960s. As one architect vividly recalled:

> In retrospect, I could see the bean counters and the money people worrying that he had too much power, because no one could make a decision without him. It was hard for offices in New York and San Francisco to make decisions without Tony's approvals...One day, all of the design department people gathered in the conference room without Tony, and they said: 'We are going to change the design culture of this place.' It was crazy. That day they decided to change the way that design was done for the last 40 or 50 years. And, so they decided to do a studio design concept instead.[95]

Indeed, the shift in structure from departments and divisions to one based on a "studio" revealed a radical reversion in the culture of conglomerate practice, and it contradicted the historical conditions upon which DMJM and thus AECOM was founded. While a number of self-published histories and reflections by AECOM have, since the 1990s, continued to promote a culture of practice predicated on change and collaboration that represented the antithesis of a "star"-based system, the formation of a design studio carried with it an unavoidable genealogy of practice that imposed an inherent boundary upon architects and presented a contrasting image of them—as authorial individuals working alone.[96] The shift from a divisional and departmental structure to a

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[94] KMJR was established by Richard Keating, Michael Mann, Robert Jernigan, and Lauren Rottet after an attempt to establish a Los Angeles SOM office failed to take hold. See: Danette Riddle, "Building on Change," in *Architecture at Work: DMJM Design Los Angeles* (New York: Edizioni Press, Inc., 2004), 14–21. Dworsky Associates was founded by University of Michigan football captain, Daniel Dworsky in 1953, which won the 1984 Firm of the Year Award from the California Council of the AIA and was acquired by CannonDesign in 2000. See: Leon Whiteson, "L.A. Architecture's Solid Gray Brigade," *Los Angeles Times,* May 26, 1988; and "Dan Dworsky, '50" *The Michigan Alumnus,* Vol 99, (Sept/Oct 1992), p. 54.

[95] Former architect in discussion with author, Los Angeles, CA, September 2, 2015.

[96] See, among others: *Architecture at Work: DMJM Design Los Angeles* (New York: Edizioni Press, Inc., 2004); and Rodengen, *AECOM: 20 Years and Counting*; Sarah Palmer, ed., *Architecture at Work: DMJM Design Los Angeles* (New York: Edizioni Press, Inc., 2004), p. 19.

studio suggested an alternative history of practice that inherently limited the ability of architects to embrace positions and practices beyond the traditional domains of design, restricting their ability to define their work as socially and economically equivalent to a broader range of practitioners.

CHAPTER 5

Conclusion: Architecture Practice in a Global Economy

The three-person architecture partnership founded by architects Phillip Daniel, S. Kenneth Johnson, and Arthur Mann in 1946 in Santa Maria, California was hardly recognizable by 1990. As part of a five-firm multinational corporate conglomerate, named AECOM Technology Corporation, the architects at DMJM were enmeshed in work that ranged in scope from architecture to real estate to economics, spanning seventy-one international offices—from the US to Egypt to Thailand to Chile to Antarctica. While DMJM represented only one part of AECOM's consortium, the firm as a whole continued to expand its services by following the geographical and multidisciplinary path set forth by DMJM. Therefore, the emergence of AECOM, as well as its continued trajectory over the course of the twenty-first century, highlights the profound significance of DMJM's legacy to the history and theory of architecture practice. Beyond "Architecture and Design," AECOM's services by 2017 began to include those as far-ranging as "IT and Cybersecurity," "Cost Management," and "Equity Investment," which enabled the firm to not only design buildings for their clients in ways that are familiar to histories of architectural practice, but also to build, finance, and operate them after they were constructed. The implications of this expanded scope of work were expounded by AECOM's location in the city, as the firm moved its design offices in 2001 from DMJM's One Park Plaza on Wilshire Boulevard to the central business district of downtown Los Angeles, embedding itself in a homogenous sea of banks and financial institutions—a fitting juxtaposition for a firm that, too, offered financial services.[1] However, unlike financial institutions, which held no inherent allegiance to the built environment, AECOM had become a direct conduit through which finance capital could be directly channeled into the built environment.

If the history of DMJM demonstrates that the strength and shape of large architectural firms under late capitalism parallels the processes of urbanization, then the prominence of AECOM in downtown Los Angeles might itself be understood as a marker for the city's material and economic strength: AECOM was listed on the New York Stock Exchange as a publicly traded company in 2007, and by 2015, the firm was the largest revenue-generator of any publicly traded company in the city of Los Angeles, rivaled only by those in neighboring cities, such as the behemoth entertainment conglomerate Walt Disney Co., based in Burbank, and the biotechnology company Amgen, Inc. in Thousand Oaks.[2] Just as DMJM was recognized by the city council for its remarkable business performance in 1958, AECOM was acknowledged as a significant economic force for the city, over fifty years later, by the Mayor of Los Angeles, Eric Garcetti, who argued that AECOM represented "a strong signal of confidence in LA's economy and in our brand as a place to do business."[3]

However, the history of AECOM and its particular relationship to the discipline of architecture is complicated by the firm's very composition, since it was comprised of many firms and individual subsidiaries far-ranging in service and equally nuanced in their historical

[1] By the 2000s, the firm's global headquarters was separated and located in The SunAmerica Center on the Avenue of the Stars, designed by Johnson Fain and built in 1990, while the former DMJM office, which included the design, engineering, and planning services, moved from DMJM's former One Park Plaza offices to downtown's City National Plaza in 2001, and again in 2015 to downtown's One California Plaza. See: Brad Berton, "Architect Firm DMJM to Move Its Headquarters Downtown," *Los Angeles Times*, June 26, 2001; and Hannah Miet, "AECOM to Lease at One California Plaza," *Los Angeles Business Journal*, Monday, May 14, 2018.

[2] Stuart Pfeifer and Chris Kirkham, "Merger of AECOM and URS to Create Giant LA Construction Firm," *Los Angeles Times,* July 13, 2014.

[3] Ibid.

foundations. Indeed, the rise of AECOM has been described by critics and historians as a "Quiet Giant,"[4] or akin to the all-powerful, fire-breathing, and multi-headed "Leviathan"—the biblical sea dragon that business historians Alfred J. Chandler, Jr. and Bruce Mazlish have compared to multinational corporations, and which Thomas Hobbes compared to a state or commonwealth in the sixteenth century.[5] Beneath these enigmatic descriptors, however, DMJM's particular history makes visible the slow shifts in architecture practice from Fordism to post-Fordism, and more broadly from capitalism to late capitalism, that produced multinational corporate conglomerates in architecture. At one level, the connections between DMJM and AECOM were quite direct. DMJM's top business executives at the end of the twentieth century, Richard Newman and Albert Dorman, sought to maintain the balance between design and profit that had characterized their relationship while at DMJM, and they were responsible for outlining the objectives and direction of AECOM in 1990 in the same building that much of DMJM's own history was written: One Park Plaza. At a second, less direct level, DMJM conditioned the very culture of practice upon which AECOM was based. Since its advent, DMJM was founded upon a culture of egalitarian pretenses, as well as socio-economic equivalencies between practitioners, that enabled architects to be unabashed in their interest in business, economic markets, and profit. The willingness of architects to embrace economic theory, together with their close ties to local,

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[4] Ryan Vaillancourt, "The Quiet Giant: With a Massive Roster of Projects, AECOM, and Its 920 Local Employees, Are Poised to Shape the Future of Downtown." *Los Angeles Downtown News,* October 4, 2010, p. 6, 26, 27.

[5] *Michael Kubo, Architecture Incorporated: Authorship, Anonymity, and Collaboration in Postwar Modernism,* (Ph.D. Dissertation, Massachusetts Institute of Technology, 2017), p. 301. Alfred D. Chandler and Bruce Mazlish, eds., *Leviathans: Multinational Corporations and the New Global History* (Cambridge, UK; New York: Cambridge, 2005). Chandler and Mazlish borrow the term Leviathan directly from Thomas Hobbes's seventeenth century book *Leviathan,* in which he used the sea monster as an analogy for the simultaneously physical and imaginary structures of a state or commonwealth. Thomas Hobbes, *Leviathan, or The Matter, Forme and Power of a Common Wealth Ecclesiasticall and Civil* [1651], (New York: Cosimo, 2009).

state, and federal government, encouraged them to readily adapt their practices, as evidenced by the firm's seamless shift from a partnership in the 1940s to a fully integrated corporation by 1960 to a multinational corporate conglomerate a decade later. While the use of the term "conglomeration" in business literature referred to a particular structure of practice that was popularized by industrial organizations during the 1960s and 1970s, this research demonstrates how the term also signified a constructivist view of practice predicated on the ability of architects to embrace new identities, roles, and values, rather than by reproducing those historically imposed upon them.

Beyond the significance of DMJM's history to the formation of AECOM, DMJM reveals how American architects, by the end of the twentieth century, were no longer connected through economic markets in which they competed as individuals for work, but instead through their firms, wherein they worked to advance collective goals set free from the demands of consumers. By 1992, sociologist Robert Gutman argued that firms, rather than studios or ateliers, had become irreducible units of capitalist development. The prominence of firms, as well as their ability to be consumed, marketed, and combined through corporate conglomeration, exemplified the ways in which the language of business, as well as of law, had become fully absorbed by architects. As Gutman asserted: "it is difficult to operate in the contemporary [1992] marketplace and still think of oneself as acting singly or conducting an atelier. The language of the attorney about corporation law, of the accountant about plowed-back earnings, or of the marketing strategist about positioning is inevitably assimilated into the discourse of architects, just as it is standard now in the thinking of their clients."[6] Yet despite Gutman's assertions, it was only in practice, as Dana Cuff argued only one year prior, rather than in school, where architects could

[6] Gutman, "Emerging Problems of Practice," p. 198.

learn these new languages. By isolating design from theories of capital accumulation or capitalist critique, Cuff argued that "schools highlight the importance of pure design by removing from its study key aspects of professional practice: the client or patron, the coordinated group process of design, and economic and power relations…Architects are thus not trained to be alert to significant relations of authority, economics, power, group decision-making processes, management, and so in."[7]

For historians and ethnographers, the multi-firm structure of practice complicates the ways in architecture has been defined and studied. Rather than by defining firms as single teleologic entities with definitive edges, clear beginnings, or absolute ends, DMJM's history reveals how the complexities associated with multi-firm associations, affiliations, and conglomeration by the end of the twentieth century began to defy such boundaries. While many histories of architecture practice end by describing how a single firm collapsed, dispersed, or went bankrupt, such as of Caudill Rowlett Scott (CRS) in Texas when it was fractured in 1994, or of The Architects Collaborative (TAC) in Massachusetts when it went bankrupt in 1995, the history of DMJM and thus of AECOM reveals how practices and cultures were able to be maintained and reproduced far longer than the firm's name. To describe the history of CRS as a practice might instead mean to describe the ways in which the firm's culture persisted after the firm's so-called demise, carried forth by its architecture group when it was sold to Missouri-based Helmuth, Obata and Kassabaum (HOK) in 1994; by its Engineering and Construction groups when they were sold to California-based Jacobs Engineering; and by its cogeneration group, CRSS Capital, when it was sold to the engineering firm Tractebel. To study firms such as The Architects Collaborative might mean to consider the various successor firms that broke off

[7] Cuff, *Architecture: The Story of Practice*, p. 45.

as independent practices during the 1960s and that continued to operate after the firm's bankruptcy, including the Cambridge Seven Associates, formed in 1962, or the Architectural Resources Cambridge, formed in 1969.

This perpetual fracturing and re-combining of firms serves as a reminder that AECOM also represents only one particular version of architecture practice along a continuum of capitalist development, and thus to view AECOM—or any multinational corporate conglomerate—as a penultimate version of architecture practice would be to disregard the imminent efforts by architects as they may adapt to economic systems and shifting means of production in the future. While Chandler and Mazlish describe the rise of multinational corporations as "Leviathans," akin to the impenetrable, many-headed biblical sea monster that represented the forces of chaos, the Leviathan was also tellingly disintegrated, according to the myth, during its encounter with the Hebrew God, Yahweh. While the Leviathan, like a multinational corporation, according to Chandler and Mazlish, grows by transcending geographical boundaries in accordance with capital accumulation, the Hebrew God Yahweh ultimately defeated the Leviathan in Psalm 74:12-14 by crushing its many heads into several parts in order to feed the people inhabiting the wilderness. The fracturing of the Leviathan into parts settles the chaos of the sea in which it lives, and thus Yahweh's victory establishes a new sense of calm, order, and absolute power. Therefore, while multi-firm associations, joint-ventures, and corporate conglomerates characterize a seemingly all-powerful form of late capitalist architectural practice, emboldened by the state and epitomized by AECOM, the looming possibility and capability of Yahweh—perhaps now a stand-in for the invisible hand of capitalism or the visible hand of regulation—to fragment or disassemble the firm may grip at any moment to establish a new sense of order, calm, and possibility for architectural practice.

Indeed, the seemingly limitless scope of work offered by AECOM enabled the firm to produce entire urban systems in ways that architects at DMJM could only imagine, reinforcing a Leviathan-like view of itself, as a senior vice president of AECOM has argued: "We are AECOM, we can do anything."[8] Looking past the scale and scope of singular buildings, AECOM defines its site for work as the substrate beneath buildings. For example, the firm was hired in 2008 to design and plan a 16.8 square-mile island adjacent to Abu Dhabi, Saadiyat Island—a proposed city with a projected population of 160,000 residents (only seventy more people than AECOM's size) and near 220,000 workers by 2030. Nonetheless, the spotlight shined by architectural scholars and critics onto the Island's development has reinforced historical views of architectural practice by highlighting the named architects, such as the quintet of Pritzker Prize Winners, and their projects: Jean Nouvel's Louvre Abu Dhabi Museum, Norman Foster's Zayed National Museum, Frank Gehry's Guggenheim Abu Dhabi, Zaha Hadid's Performing Art Center, and Tadao Ando's Maritime Museum.[9] Against this backdrop, DMJM's history challenges one to look beneath these singular buildings to instead find an underlying order holding such a city together—the work of a Quiet Giant or a Leviathan—such as the substrate of city surfaces, infrastructure, management, and maintenance. AECOM has described its chief contributions to the island as the domain of architecture and design, planning, and management, though it has articulated a scope of work that encompasses almost every part of the built environment but individual buildings themselves, as the

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[8] Aaron Seward, "Making It Big," *Architects Newspaper*, June 16, 2010. https://archpaper.com/2010/06/making-it-big/

[9] See, for example: Cynthia P. Schneider, "Abu Dhabi and What It Means to Be a Global Cultural Capital." *Georgetown Journal of International Affairs* 13, no. 2 (2012): 99-106. For popular press, see: "Saadiyat: 21st Century Architectual Mecca?" *Phaidon,* November 12, 2012*;* Jonathan Hilburg, "Jean Nouvel's Louvre Abu Dhabi opens to the public after a decade," *Architects Newspaper,* November 9, 2017; Henry Melcher, "Frank Gehry on his eccentric Guggenheim Abu Dhabi Museum," *Architects Newspaper,* December 12, 2014.

> external works beyond the building fabric: hard surfaces; planting works; furniture; signage; lighting; public infrastructure elements such as utilities boxes and control cabinets; playing fields and related facilities; and subsurface elements, such as irrigation systems and drainage. Along with that, AECOM will also be providing master planning, economics and architecture/engineering services on selected facilities on and off of the island… [and] an electronic program management system to allow real-time project tracking across all TDIC [Tourism Development Investment Corporation's] developments.[10]

While this unhinging of the architect from the production of buildings altogether suggests a profound historical contradiction of terms—that architects were no longer responsible for the designing of buildings—it also exemplifies the ways in which the role and efficacy of the architect was, like at DMJM during the early 1960s, ironically called into question. Of AECOM's 90,000 employees by 2017, only 1,491 were architects—less than two percent of all employees. Moreover, the revenue generated by architecture alone accounted for only $320-329 million of the firm's $18.2 billion.[11] In response, AECOM made substantial economic investments into a program for self-evaluation, hoping to "reinvigorate" and "redefine" the value of architecture within the firm.[12] However, as DMJM's history reveals, the practice of architecture was not only understood as socio-material negotiations between architects, their clients, contractors, and the buildings they collectively produced, but also as negotiations with the histories embodied by each practitioner or acquired firm. Therefore, AECOM's own history, including the culture of equivalency refined by architects and business leaders at DMJM, as well as the work and theories of design developed by architects such as Anthony Lumsden, offers immeasurable insight into the value and positionality of the architect within a multinational

[10] "Saadiyat Island," AECOM, accessed February 21, 2018, https://www.aecom.com/mm/projects/saadiyat-island/.

[11] For data specific to architecture, see: Building Design, *The World's Largest Architecture Practices* (January 2017), p. 14. For data specific to the firm as a whole, see: AECOM, *Imagine It. Delivered. Annual Report* (2017).

[12] Email correspondences with current AECOM business leader, February 2016.

corporate conglomerate. Pressed by a necessity to make legible the economic value of their labor, architects at DMJM took on projects that were historically viewed as marginal at best in their relationship to architecture—including the paperwork required to organize and maintain an architecture firm, ballistic missile bases needed by the US to deter international aggressors, or wastewater treatment plants necessary to facilitate urban growth in Los Angeles—and defined them *as* architecture.

Upon the formation of AECOM in 1990, DMJM was imagined to be the foundation for the firm's design services, and it continued to operate semi-autonomously beneath the firm's corporate umbrella. However, DMJM was not immune to internal mergers and reconfigurations, which began to fundamentally obscure the architect's role and confound the legacy of DMJM. In 2000, for example, one part of DMJM was merged with engineering firm Frederic R. Harris to create "DMJM Harris" in order to more specifically focus on "infrastructure and transportation business segments," while the remaining part of DMJM merged with the engineering and architecture firm Holmes and Narver Inc. to form "DMJM H&N" and to focus on "facilities business segments."[13] In 2003, DMJM H&N was reorganized again into three parts: DMJM Design, DMJM Management, and DMJM Technology.[14] More importantly, however, immediately following the economic recession of 2008, DMJM's name disappeared from AECOM's roster altogether in 2009, when the dozens of affiliated companies of AECOM were collapsed into a single anonymous brand in order to better coordinate the various expertise within the company and to unify its public image.[15] AECOM rose to the top of all revenue, size,

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[13] Rodengen, *AECOM: 20 Years and Counting*; Sarah Palmer, ed., *Architecture at Work: DMJM Design Los Angeles* (New York: Edizioni Press, Inc., 2004), p. 19.

[14] Ibid., p. 40.

[15] Ryan Vaillancourt, "The Quiet Giant: With a Massive Roster of Projects, AECOM, and Its 920 Local Employees, Are Poised to Shape the Future of Downtown." *Los Angeles Downtown News,* October 4, 2010, p. 6, 26, 27.

and profit-based rankings by the *Engineering News-Record* in 2009—a position that it has since maintained. While the erasure of DMJM's acronym and the individual names it represented confirmed an ultimate collapse of authorship in architecture, the history of DMJM remained no less significant to AECOM. As Sigfried Giedeon argued, "anonymous history […] must be traced back to the particulars from which it arises. Anonymous history is many sided, and its different departments flow into one another. Only with difficulty can they be separated."[16] Therefore, while the individual names of architects, such as Phillip Daniel, Arthur Mann, S. Kenneth Johnson, and Irvan Mendenhall were replaced by anonymized services at the end of the twentieth century—Architecture, Engineering, Construction, Operations, and Maintenance—and no longer provided meaning or significance to their firm as names in particular, the culture of practice that they developed endures. DMJM's culture is reproduced in everyday practice even though it may not be perceived, and it is made legible by histories that animate the conversations, debates, and documents that otherwise lay dormant in the firm's archives—the very site where the rules of practice are established.

[16] Giedion, *Mechanization Takes Command*, p. 4.

TABLES

1950	I. F. Mendenhall, Civil Engineer
1965	Albert A Dorman, Civil Engineer
1968	Philip Abrams, Consulting Engineers, Inc.
1972	Phillips-Carter-Reister & Associates, Inc.
1972	Logicomp
1972	Real Estate Resources, Inc.
1972	Associated Design Planning & Art, Inc.
1972	Realtech, Inc.
1972	Atadeco
1972	Publishing Services
1974	Hilton Engineers & Planners
1976	Forssen Engineers, Inc., Alaska
1976	Curtis & Davis Engineering/Architect, New Orleans
1978	Technical Management Services. Inc. (TMSI)
1978	TMSI, Arabia
1978	TMSI Contractors, Inc.
1980	American Science & Engineering, Co.
1980	Arctic Slope Technical Services, Inc.
1980	Development and Technology Consultants, Inc.,
1980	Wilhamp, Inc.
1981	Coon, King, Knowlton, Engineers
1981	Hummel, Giles
1981	Adam, Hamlyn, Anderson Civil Engineering
1985	**Ashland Technology Corporation Formed [ATC]**
[1984]	Homes & Narver, Inc. [by ATC]
[1984]	Williams Brothers Engineering [by ATC]
1987	Frederic R. Harris [by ATC]
1987	Consoer Townsend Engineers [by ATC]
1987	Planning Research Corporation [by ATC]
1987	Engineering Consultants, Inc. [by ATC]
1987	P & D Technologies [by ATC]
1986	GSAS Architects and Planners, Arizona [by DMJM]
1989	Randall Vosbeck, Architecture [by DMJM]
1990	**AECOM Technology Corporation Formed**
1993	Envirodyne Engineers, Inc.
1994	Keating, Mann, Jernigan, Rottet
1996	McClier Corporation
1996	Turner, Collie & Braden, Inc.
1999	W. F. Castella & Associates, Inc.
1999	Spillis Candela & Partners, Inc.
1999	Day & Zimmerman Infrastructure
2000	Guy A. Maunsell Ltd.
2000	Metcalf & Eddy
2000	KPMG Consulting
2001	Oscar Faber PLC.
2001	Warren Group, Ltd.
2001	Harding Consulting, Inc.
2002	Meritec Group Ltd.
2002	Samuel L. Moore & Associates, Inc.
2004	Planning and Dev. Collaborative International, Inc.
2004	UMA Group Ltd.
2004	W.E. Bassett
2004	JWD Group
2005	ENSR International
2005	Eckbo, Dean, Austin and Williams, Inc. (EDAW)
2005	The Austin Company
2005	Bullen Consultants Ltd.
2005	Nanchang Environmental Design Institute (51%)
2005	Entranco Inc.
2007	Korve Engineering
2007	Hayes, Seay, Mattern & Mattern
2007	The RETEC Group
2007	HLA-Envirosciences
2007	KMK Consulting, Ltd.
2007	STS Consultants, Ltd.
2008	Gartner Lee Ltd.
2008	Earth Tech.
2008	Economics Research Associates
2008	CityMark
2008	The Services Group
2008	Totten Sims Hubicki Associates
2008	Tecsult, Inc.
2008	Boyle Engineering
2009	LAN Engineering
2009	Savant International
2010	SSI Services
2010	Ellerbe Becket
2010	Tishman Construction Corp.
2010	Davis Langdon
2010	RSW Inc.
2010	INOCSA Ingenieria
2010	McNeil Technologies
2011	Spectral Services Consultants
2012	Capital Engineering Corp
2014	Hunt Construction Group
2014	URS Corporation
2014	ACE International Consultants
2017	Shimmick Construction

Table 1.0

Firms acquired by:
DMJM (1946-1984); Ashland Technology (1985-1989); AECOM (1990-)

	DMJM (CA)	Holmes & Narver (CA)	Leo Daly (NE)	Parsons (CA)	HOK (MO)	SOM (IL)	Perkins & Will (IL)	CRS (TX)	TAC (MA)
1965-66	36	0	12	15	1	1	0	0	0
1967-68	31	11	12	17	1	3	0	1	1
1969-70	13	10	11	11	0	1	1	0	0
1971-72	17	4	14	10	1	0	0	1	1
1973-74	33	6	8	8	5	0	3	2	0
1975-76	23	4	11	2	2	2	4	1	0
1977-78	28	3	24	0	2	2	3	2	2
1979-80	37	2	21	1	2	0	1	1	5
1981-82	30	3	16	0	1	0	0	1	6
1983-84	30	15*	15	0	2	2	0	3**	1
1985-86	39*	24	16	0	1	2	0	9	3
1987-88	21	28	13	0	3	1	0	9	1

*Holmes and Narver as well as DMJM were held by Ashland Technology Corporation in 1981 and 1984 respectively, as precursors to AECOM.

**CRS became CRS Sirrine in 1983, when it acquired J. E. Sirrine, an industrial engineering firm.

Table 2.0

Number of Active Contracts with Military Services and Agencies per year (1965-88)
Sources: US Records of Prime Contracts Awarded by the Military Services and Agencies: Series 1965-1975; 1975-2006.

FIGURES

Figure 1.0

Aerial view of AECOM's downtown Los Angeles headquarters, 2017. From: AECOM, *Annual Report* (2017), p. 9.

Figure 2.0

The Motta Building in Santa Maria, CA, ca. 1946. From: DMJM, *1946-1955 Daniel, Mann, Johnson, & Mendenhall* (Los Angeles, CA.), p. 3. AECOM company archives, Los Angeles, CA.

Figure 2.1

Franklin Harper, The Granada Buildings [Granada Shoppes and Studios], La Fayette Park Place, Los Angeles, CA, 1927. DM&J's first Los Angeles office was located here from 1947 to 1952. Security Pacific National Bank Collection, Los Angeles Public Library.

Figure 2.2

Architects Phillip Daniel, Arthur Mann, and Kenneth Johnson discuss the future of their firm with management consultant Douglas Russell of Booz, Allen, Hamilton. From: *Management Methods* (September 1957), p. 26.

Figure 2.3

Management consultant Douglas Russell examines DM&J's unpaid bills and teaches the partners how to operate a "profitable" and "pleasurable" business. From: *Management Methods* (September 1957), p. 28.

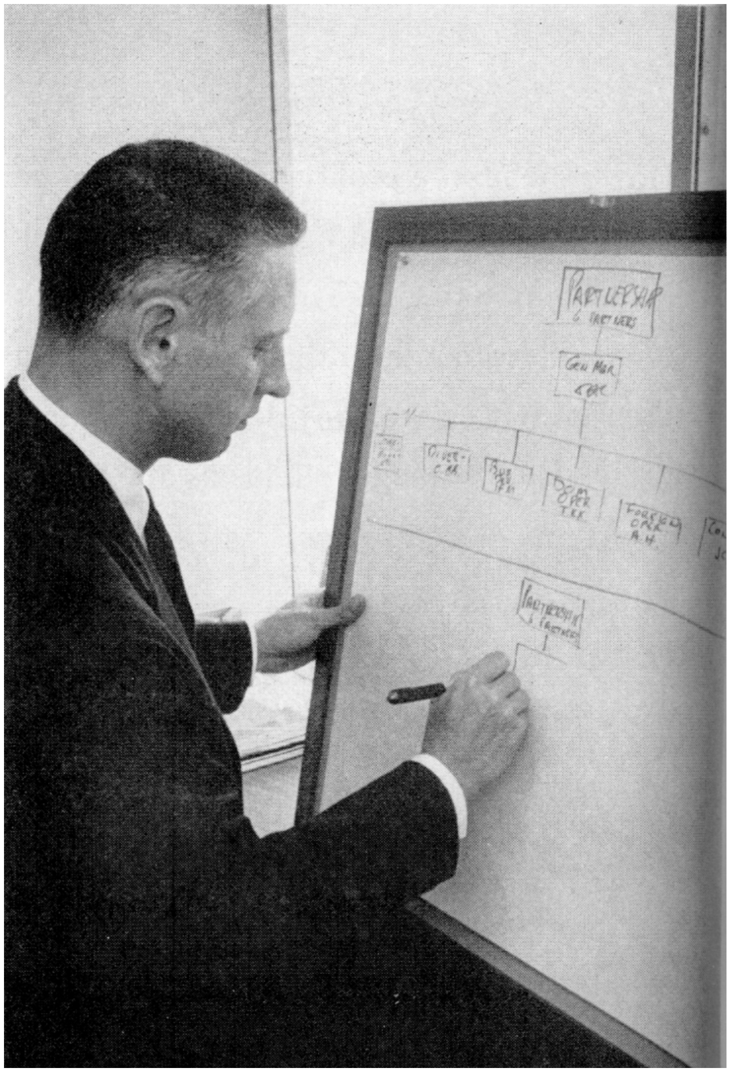


Figure 2.4

Management consultant Douglas Russell draws a new organizational diagram for the DM&J partnership, which was comprised of six partners and a general manager at the top of a pyramidal hierarchy. From: *Management Methods* (September 1957), p. 28.

Figure 2.5

The four founding partners of DMJM: (left-to-right) Phillip Daniel, Arthur Mann, S. Kenneth Johnson, and Irvan Mendenhall. From: *DMJM: Four Decades of Excellence,* 1986. W. Coburn Papers, Los Angeles, CA.

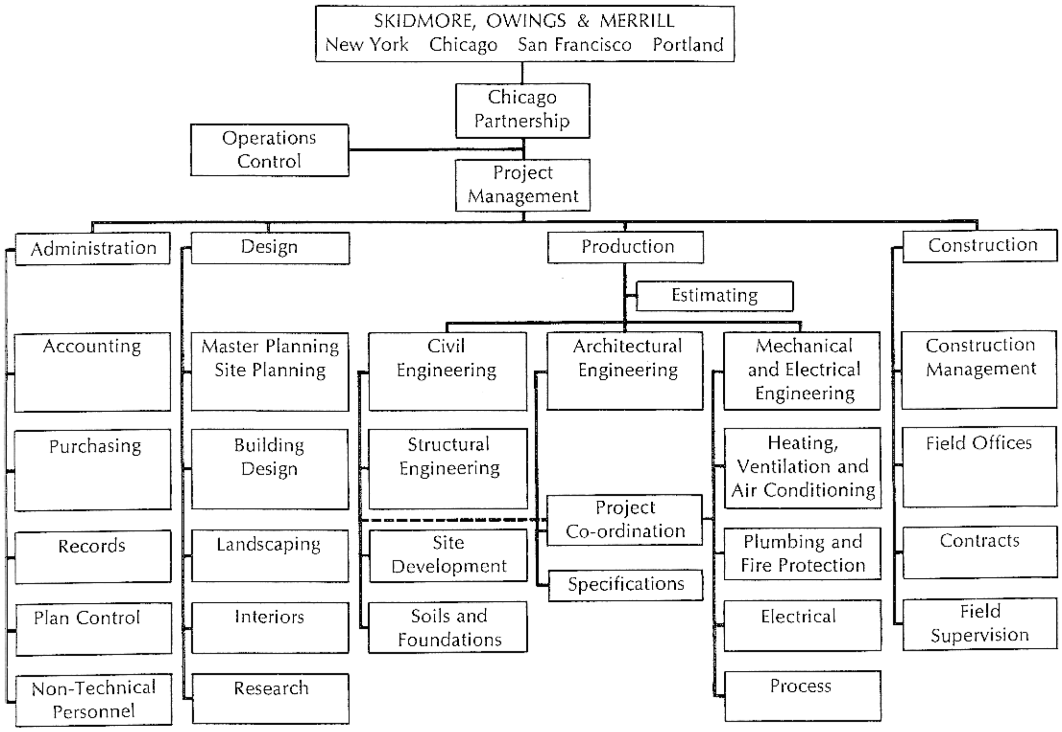


Figure 2.6

Firm Organization Chart of Skidmore, Owings, and Merrill, 1957. From: Bernard Michael Boyle, "Architectural Practice in America, 1865-1965--Ideal and Reality," in *The Architect: Chapters in the History of the Profession,* ed. Spiro Kostof (Berkeley and Los Angeles: University of California Press, 2000), p. 327.

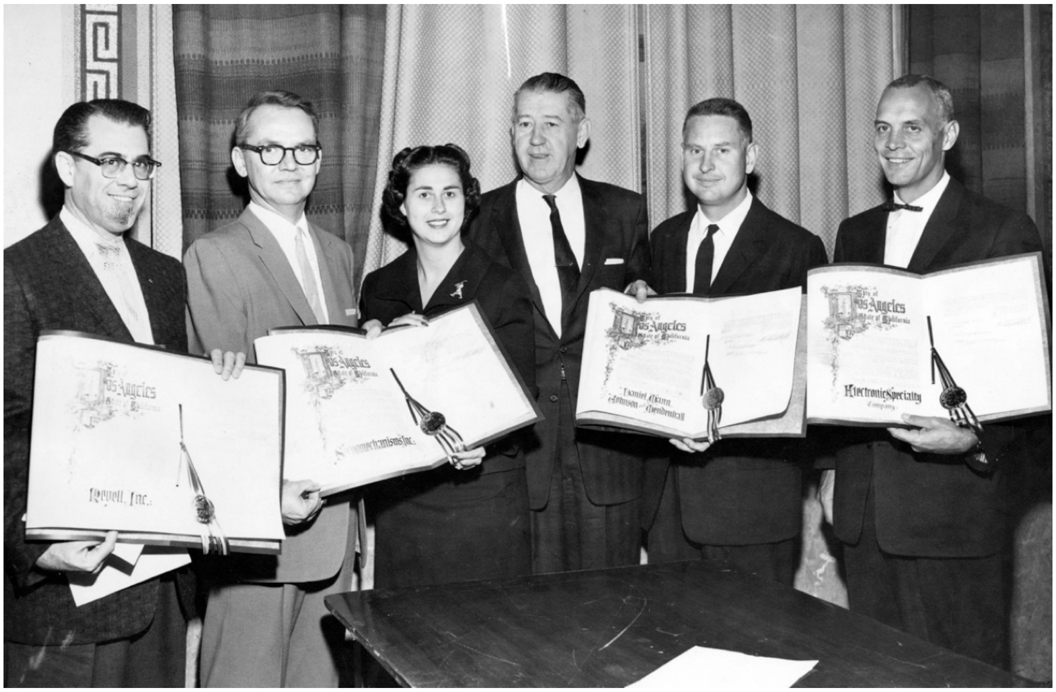


Figure 2.7

Douglas Russell (second from right) receives an award from the LA City Council on behalf of DMJM for the firm's contributions to the city's business growth, 1958. Valley Times Collection, Los Angeles Public Library.

Figure 2.8

DMJM's office at 3325 Wilshire Boulevard, Los Angeles, CA, ca. 1967. From: *Company General Brochure*, DMJM, 1967. Stanley A. Moe papers, Huntington Library and Archives, San Marino, CA.

Figure 2.9

DMJM's office at 3325 Wilshire Boulevard, Los Angeles, CA, 1963. Photo by: Julius Shulman. J. Paul Getty Trust, Getty Research Institute, Los Angeles, CA.

Figure 2.10

Reception area of DMJM's office at 3325 Wilshire Boulevard, Los Angeles, CA, ca. 1963. From: *Company General Brochure*, DMJM, 1967. Stanley A. Moe papers, Huntington Library and Archives, San Marino, CA.

Figure 2.11

DMJM office, 3325 Wilshire Boulevard, Los Angeles, CA, 1963. Photo by: Julius Shulman. J. Paul Getty Trust. Getty Research Institute, Los Angeles.

Figure 2.12

DMJM office, 3325 Wilshire Boulevard, Los Angeles, CA, 1963. Photo by: Julius Shulman. J. Paul Getty Trust. Getty Research Institute, Los Angeles.

Figure 2.13

Management consulting firm Booz, Allen, and Hamilton displays its own office as orderly and efficient by its use of secretarial procedure and organization. From: *Business Week* (April 23, 1960), p. 104-105.

Figure 2.14

The Executive Committee of Booz, Allen, and Hamilton, comprised of seven men among forty-four total partners, meet with two aides to set policies for their firm. From: *Business Week* (April 23, 1960), p. 105.

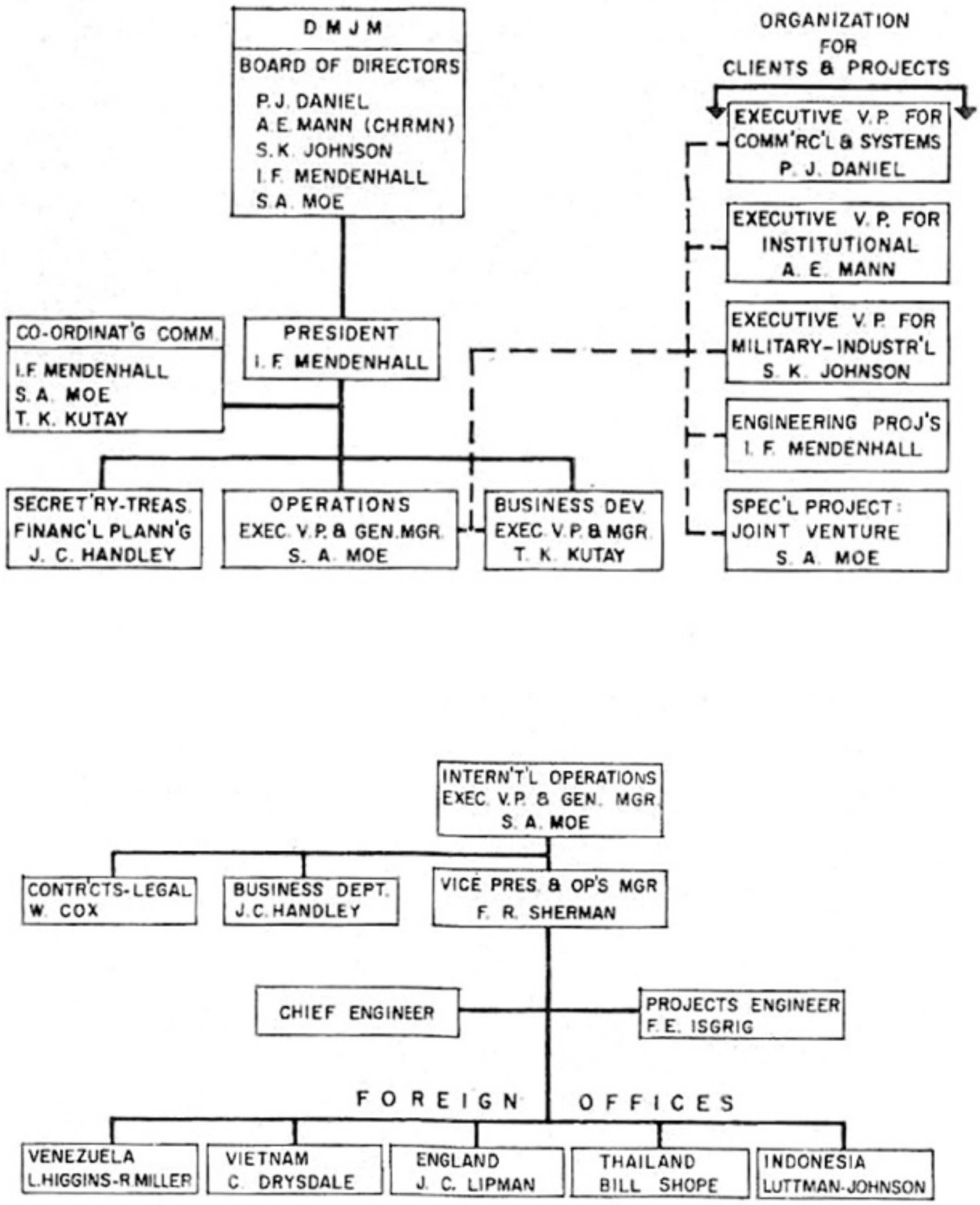
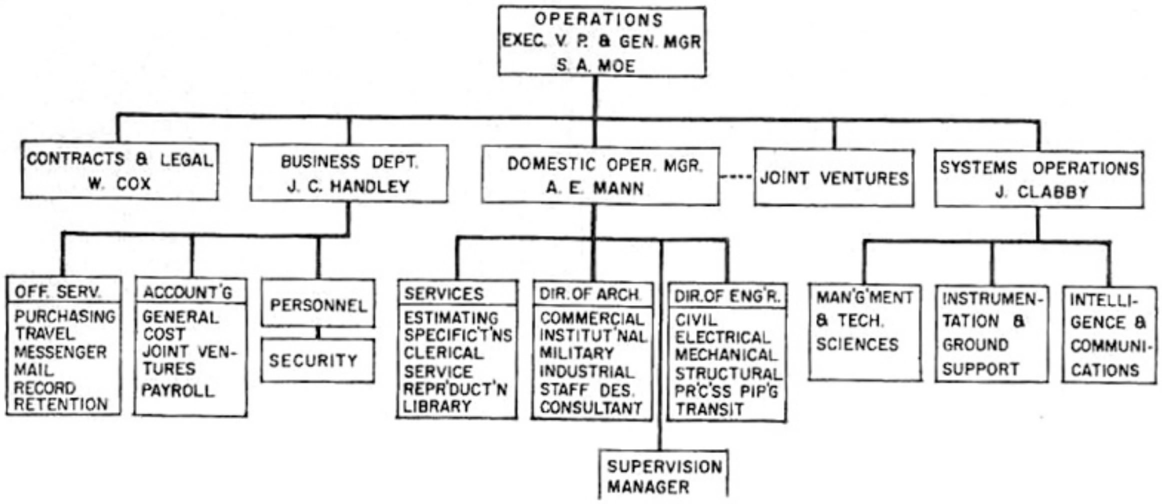


Figure 2.15

DMJM's Firm Organization Chart (top) and Foreign Operations Division Chart (bottom), 1960. From: *Architectural Record,* (June 1960), p. 190.



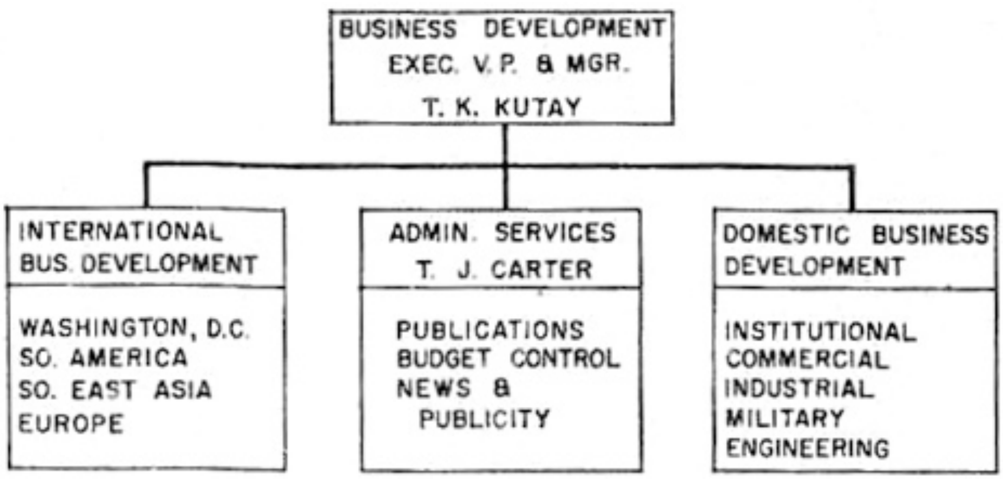


Figure 2.16

DMJM's Domestic Operations Division Chart (top) and Business Development Division Chart (bottom). From: *Architectural Record,* (June 1960), p. 191.

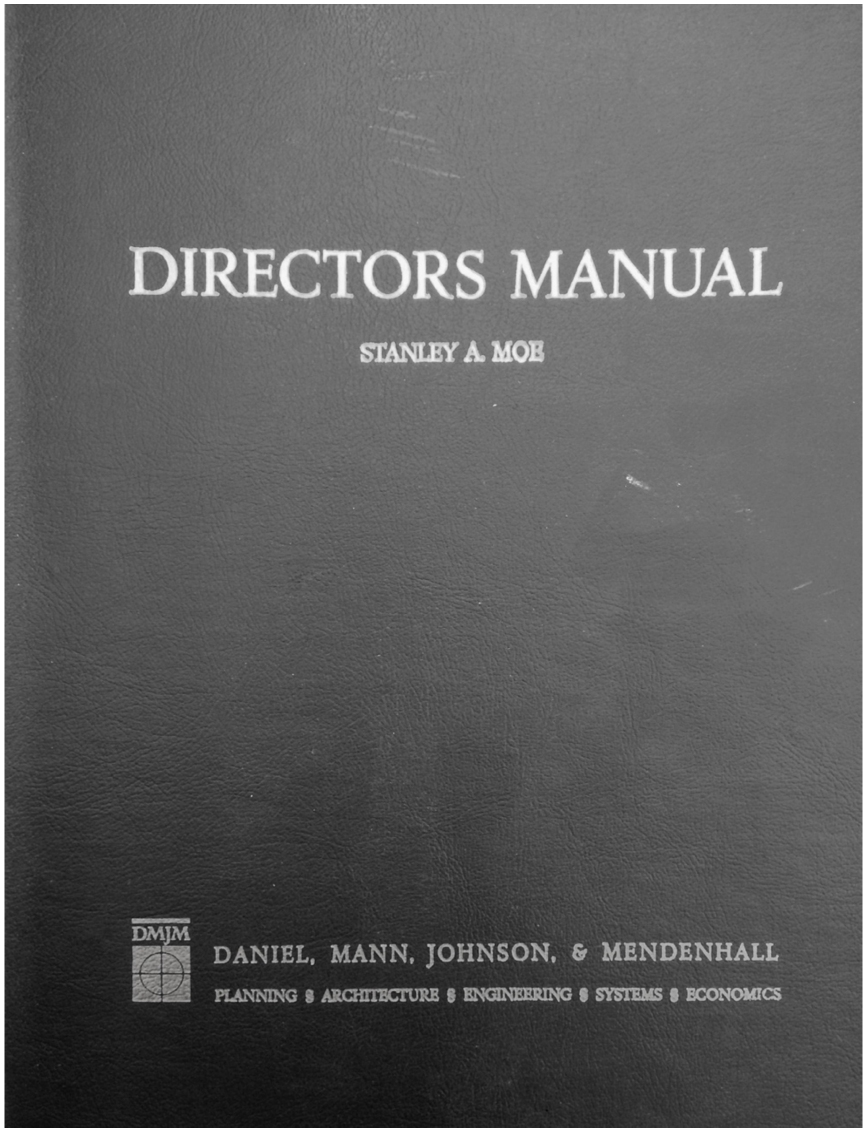


Figure 2.17

Cover of DMJM's *Standard Practices Manual,* 1965 (Director Stanley Moe's copy). Stanley A. Moe papers, Huntington Library and Archives, San Marino, CA.

DMJM

DANIEL, MANN, JOHNSON, & MENDENHALL

STANDARD PRACTICES MANUAL INTRODUCTION

SUBJECT	PREFACE	NUMBER	B
		DATE	15 DEC 65
		PAGE	1 OF 1

The Standard Practices Manual (SPM) has been established to provide DMJM personnel with a basic source of information and a guide to procedures and other publications which describe existing methods of operation or which contribute to the welfare of individual employees and provide assistance in the performance of work assignments.

The policies and procedures have been developed and written in accordance with current government regulations, contractual obligations, corporate policies and sound business practices. Each has been coordinated individually and has been approved by the supervisors and administrators concerned as well as DMJM Management.

The wide distribution given this Manual and the divisional designation of the tabbed dividers will enable all DMJM Divisions and other organizational units to reach the maximum number of employees in the most direct and expeditious manner. All organizational units are encouraged to use the Manual as a place to record standard methods of operation and procedural material that is peculiar to the needs of specific activities.

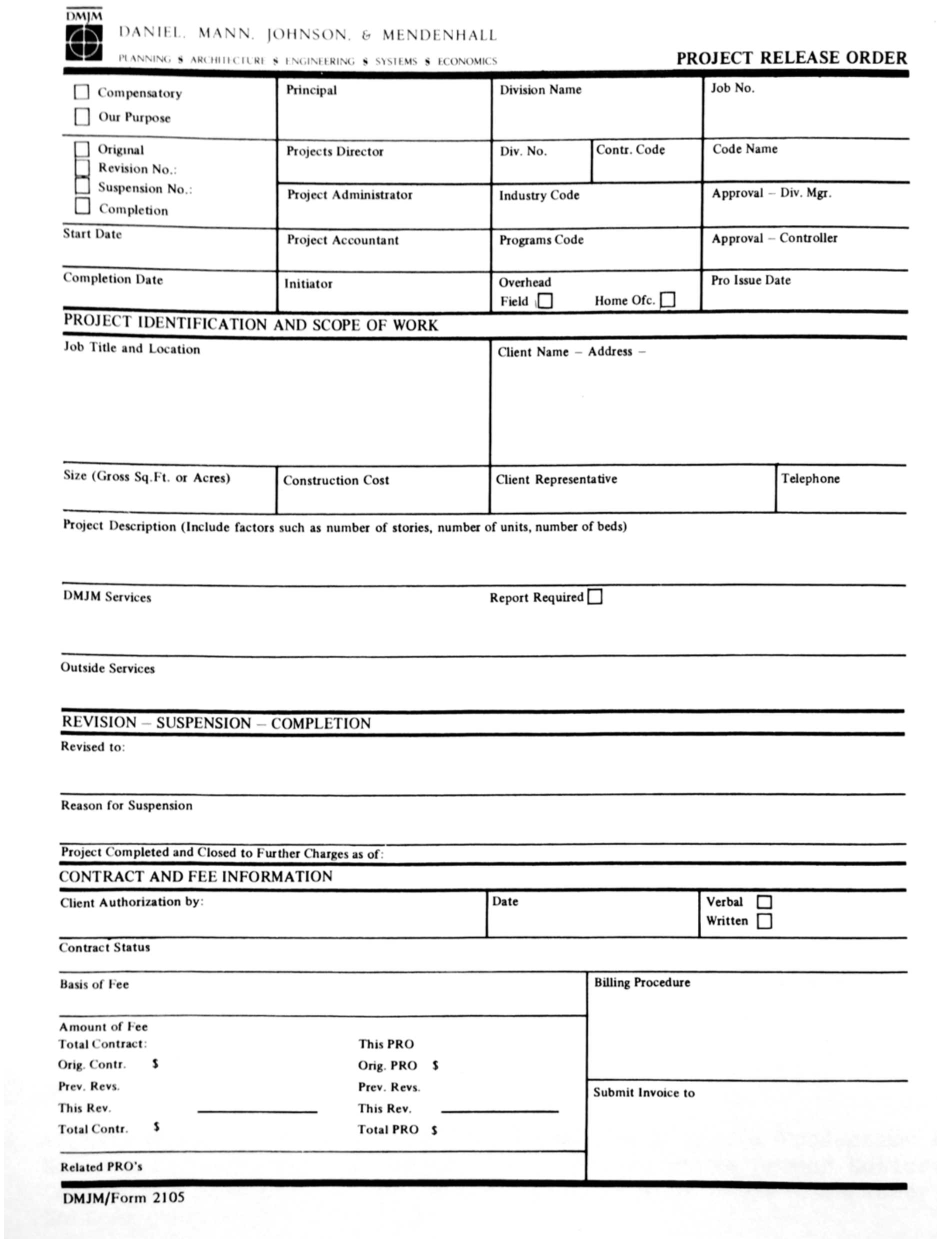
Please read the following section regarding Method of Use and review the Table of Contents and Indexes for further explanation of this Manual. In addition, call the Office of the Secretary-Treasurer for any additional information regarding the use of the Manual, status of procedures and forms or for information regarding any method of operation currently used or needed by DMJM.

Stanley A. Moe

S. A. Moe
General Manager

Figure 2.18

Introduction and overview of DMJM's *Standard Practices Manual* (Director Stanley Moe's copy), December 15, 1965. Stanley A. Moe papers, Huntington Library and Archives, San Marino, CA.


DMJM

DANIEL, MANN, JOHNSON, & MENDENHALL

PLANNING $ ARCHITECTURE $ ENGINEERING $ SYSTEMS $ ECONOMICS

PROJECT RELEASE ORDER

☐ Compensatory ☐ Our Purpose	Principal	Division Name	Job No.
☐ Original ☐ Revision No.: ☐ Suspension No.: ☐ Completion	Projects Director	Div. No. / Contr. Code	Code Name
	Project Administrator	Industry Code	Approval – Div. Mgr.
Start Date	Project Accountant	Programs Code	Approval – Controller
Completion Date	Initiator	Overhead Field ☐ Home Ofc. ☐	Pro Issue Date

PROJECT IDENTIFICATION AND SCOPE OF WORK

Job Title and Location

Client Name – Address –

Size (Gross Sq.Ft. or Acres)

Construction Cost

Client Representative

Telephone

Project Description (Include factors such as number of stories, number of units, number of beds)

DMJM Services

Report Required ☐

Outside Services

REVISION – SUSPENSION – COMPLETION

Revised to:

Reason for Suspension

Project Completed and Closed to Further Charges as of:

CONTRACT AND FEE INFORMATION

Client Authorization by:

Date

Verbal ☐
Written ☐

Contract Status

Basis of Fee

Billing Procedure

Amount of Fee
Total Contract:
Orig. Contr. $
Prev. Revs.
This Rev.
Total Contr. $

This PRO
Orig. PRO $
Prev. Revs.
This Rev.
Total PRO $

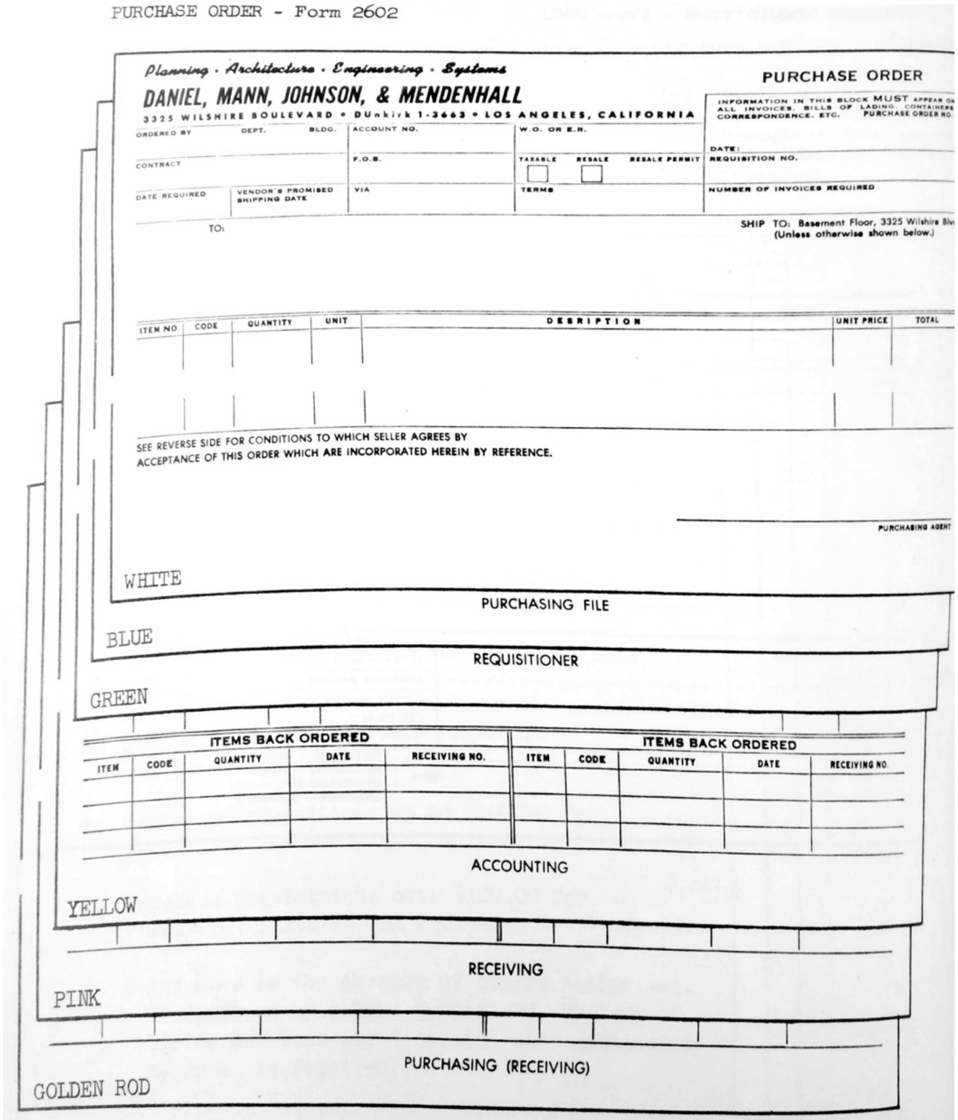
Submit Invoice to

Related PRO's

DMJM/Form 2105

Figure 2.19

Standard Project Release Order (Form 2105), DMJM *Standard Practices Manual* (Director Stanley Moe's copy). Stanley A. Moe papers, Huntington Library and Archives, San Marino, CA.



PURCHASE ORDER - Form 2602

Planning · Architecture · Engineering · Systems

DANIEL, MANN, JOHNSON, & MENDENHALL

3325 WILSHIRE BOULEVARD • DUnkirk 1-3663 • LOS ANGELES, CALIFORNIA

PURCHASE ORDER

INFORMATION IN THIS BLOCK MUST APPEAR ON ALL INVOICES, BILLS OF LADING, CONTAINERS, CORRESPONDENCE, ETC. PURCHASE ORDER NO.

ORDERED BY | DEPT. | BLDG. | ACCOUNT NO. | W.O. OR E.R. | DATE:

CONTRACT | F.O.B. | TAXABLE | RESALE | RESALE PERMIT | REQUISITION NO.

DATE REQUIRED | VENDOR'S PROMISED SHIPPING DATE | VIA | TERMS | NUMBER OF INVOICES REQUIRED

TO:

SHIP TO: Basement Floor, 3325 Wilshire Blvd. (Unless otherwise shown below.)

ITEM NO.	CODE	QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL

SEE REVERSE SIDE FOR CONDITIONS TO WHICH SELLER AGREES BY ACCEPTANCE OF THIS ORDER WHICH ARE INCORPORATED HEREIN BY REFERENCE.

PURCHASING AGENT

WHITE — PURCHASING FILE

BLUE — REQUISITIONER

GREEN

ITEMS BACK ORDERED

ITEM	CODE	QUANTITY	DATE	RECEIVING NO.	ITEM	CODE	QUANTITY	DATE	RECEIVING NO.

ACCOUNTING

YELLOW — RECEIVING

PINK — PURCHASING (RECEIVING)

GOLDEN ROD

Figure 2.20

Standard Purchase Order (Form 2602), DMJM *Standard Practices Manual* (Director Stanley Moe's copy). Stanley A. Moe papers, Huntington Library and Archives, San Marino, CA.

DANIEL, MANN, JOHNSON, & MENDENHALL

STANDARD PRACTICES MANUAL POLICIES & PROCEDURES

SUBJECT AGE LIMIT	NUMBER 32.02
	DATE 15 DEC 65
	PAGE 1 OF 2

1. PURPOSE

This section establishes policy and necessary procedures regarding age limits as related to initial employment and compulsory termination.

2. AGE LIMITS

The established age limits for initial employment and compulsory termination are as follows:

a. No individual is to be hired as a full time permanent employee if he has attained the age of 65 or over.

b. An employee reaching the age of 65 will normally be expected to terminate his services. An exception may be made if the employee has such responsibility and capability that he is asked to continue, providing his health will permit continued full time employment. DMJM may at any time require medical certification of health status.

c. In no event will an employee continue working for DMJM beyond the age of 72.

3. TERMINATION

a. Sixty days prior to an employee's 65th birthday, the Personnel Office will notify the appropriate Section or Department Head. Unless there is a specific request from the Section as Department Head for continued employment, termination date will be set for the end of the week nearest the 65th birthday. The Supervisor will so inform the employee not less than 30 days prior to the termination date.

b. The terminating employee will then be referred immediately to the Personnel Administrator for information on Social Security and any other benefits, including the Profit Sharing Trust Fund, to which he may be entitled.

Figure 2.21

Protocol for Age Limits, DMJM *Standard Practices Manual*. December 15, 1965. Stanley A. Moe papers, Huntington Library and Archives, San Marino, CA.

DANIEL, MANN, JOHNSON, & MENDENHALL

STANDARD PRACTICES MANUAL POLICIES & PROCEDURES

NUMBER	32.06
DATE	15 DEC 65
PAGE	1 OF 1

SUBJECT MATERNITY TERMINATIONS

1. PURPOSE

This section establishes policy and necessary procedures regarding the mandatory termination of female employees during pregnancy periods.

2. TERMINATION

Since it is desired that female employees do not work so late into pregnancy periods that their health is endangered, they will not normally be allowed to work past the end of the sixth month of pregnancy.

a. This date must be confirmed in writing by the employee's Doctor, advising the estimated date of delivery of the child and stating that she is able to work through the sixth month.

b. Employees must submit such a letter to the Personnel Office no later than the fifth month of pregnancy.

3. EXCEPTION

In some instances, exception to the above may be authorized to allow the employee to work through the seventh month. This exception may be granted only when the following conditions are met:

a. The immediate Supervisor shall specifically request in writing to the Personnel Administrator that special consideration be made.

b. Such a request must be approved by the Department Head and the Personnel Administrator.

c. Determination will be on an individual basis and advice from the Doctor must state that in his opinion there will be absolutely no harm in the employee working up to two months before delivery.

d. In no case will an employee be allowed to work beyond the seventh month of pregnancy.

4. TERMINATION NOTICE

For termination procedures see SPM Policies & Procedures, Section 32.05 Terminations.

Figure 2.22

Protocol for Maternity Terminations, DMJM *Standard Practices Manual*. December 15, 1965. Stanley A. Moe papers, Huntington Library and Archives, San Marino, CA.

DMJM

DANIEL, MANN, JOHNSON, & MENDENHALL

STANDARD PRACTICES MANUAL POLICIES & PROCEDURES

SUBJECT: PROCEDURE FOR TYPICAL DOMESTIC A-E DIVISION PROJECTS

NUMBER: 50.01

DATE: 16 MAY 66

PAGE: 3 OF 3

	P. D.	P. A. /P. E. /P. P.	E. V. P. G. M.	E. V. P. Prgms.	V. P. Mgr. A-E	D. o. D. (4)	D. H.	C. o. S.	Cont.	V. P. Treas.
PROGRAMS										
1. Development of Client	X									
2. Evaluation of Prospect	X			V						S*
3. Preparation of Proposal	X		V(3)	V	V(5)		S(5)		S	S
4. Presentation of Proposal	X					S*				
5. Negotiations with Client	X									
6. Establishment of Basic Terms	X		V(3)	V	V		S(5)		S	S
7. Preparation of Agreement	S						S(5)		X	V
8. Securing Signature on Agreement	X									
9. General Programs & Objectives	X	S			I	S*	S			
PRODUCTION										
10. Prod. Approach & Definition	V	X			V	S*	S			
11. Concept Drgs. & Feas. Studies	V	S				X*	S			
12. Prelim. Drgs. & Studies	V	S				V*	X			
13. Final Drgs. & Documents	I	S			V	V*	X			
14. Schedules & Budgets	I	V			V		X			I
15. Client Presentations & Approvals	V(1)	X				S*				
16. Modifications to A-E Agreement										
16a. Initiates Modification	V	X	V(3)		V		V		S	V
16b. Negotiates Modification	V(1)	X								
17. Publicity & P. R.	X(2)	S		V		V*				
CONSTRUCTION SUPERVISION										
18. Supervision of Construction		S						X		
19. Change Orders to Const. Contrs.		S						X		
20. Problems: Client-Contractor	S	S	I(3)					X	I	I
21. A-E Agreement Modifications	V	X	V(3)					S	S	V
22. Final Inspection	I	S						X		
23. Client Follow-Up	X	S						S		

Remarks

*As required

(1) Participation when determined necessary by either P. D. or P. A. /P. E. /P. P.

(2) P. R. Support

(3) V. P. Mgr. A-E Div. consults with E. V. P. Genl. Mgr. on complex situations

(4) This column applies to D. o. D. as required on A-E projects; D. o. P. on planning projects; Manager of Eng. on engineering projects

(5) As related to services, schedules, and fees

P. D. - Project Director
P. A. - Project Architect
P. E. - Project Engineer
P. P. - Project Planner
E. V. P. GM - Exec. Vice Pres. Genl. Mgr.
E. V. P. Prgms - Exec. Vice Pres. Programs
V. P. Mgr. A-E - Vice Pres. Mgr. A-E Div.
D. o. D. - Director of Design
D. H. - Dept. Head (Arch., Engr.)
C. o. S. - Chief of Construction
Cont. - Contracts Dep
V. P. Treas. - Vice Pres. Treasurer
X - Responsible
V - Needs Approval Of
S - Support
I - Keeps Informed

Figure 2.23

Procedures for a typical architecture or engineering project, DMJM *Standard Practices Manual*. May 12, 1966. Stanley A. Moe papers, Huntington Library and Archives, San Marino, CA.

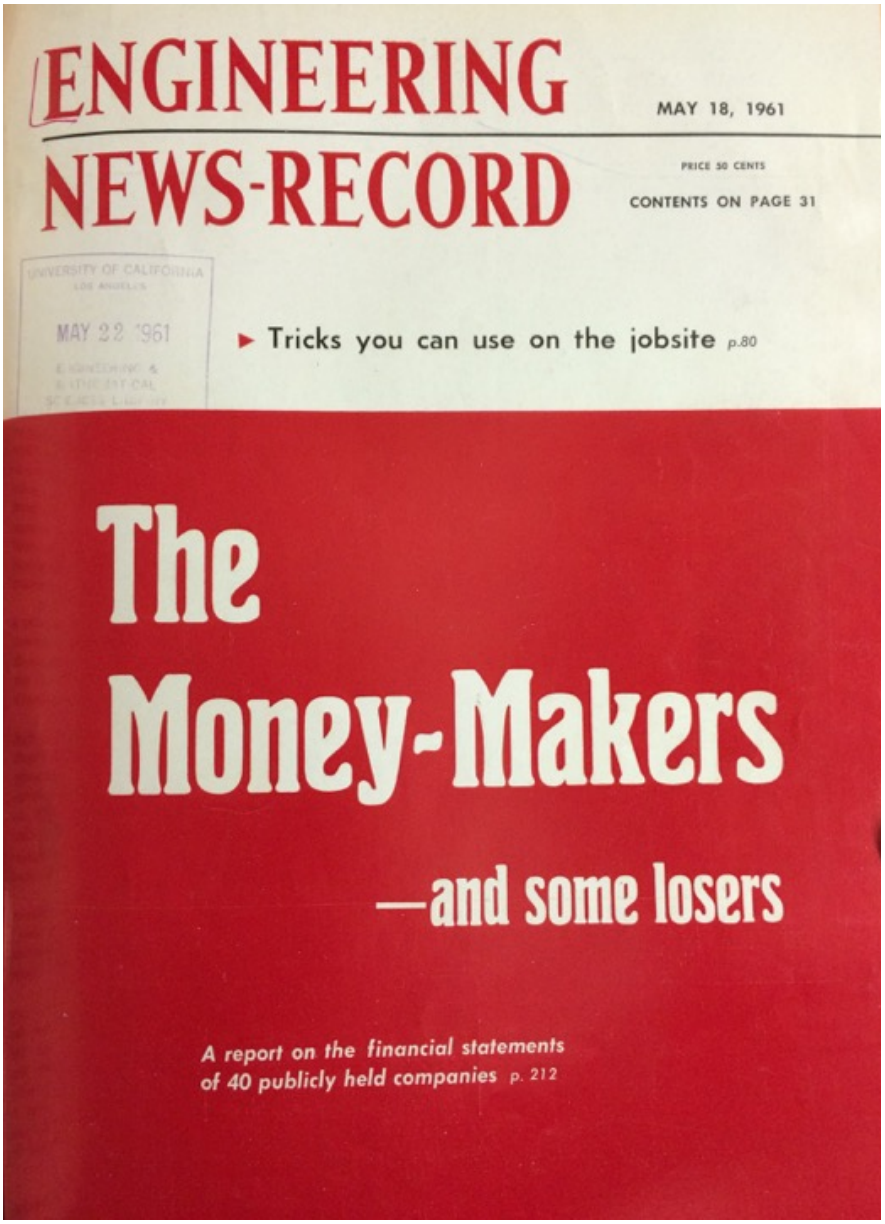
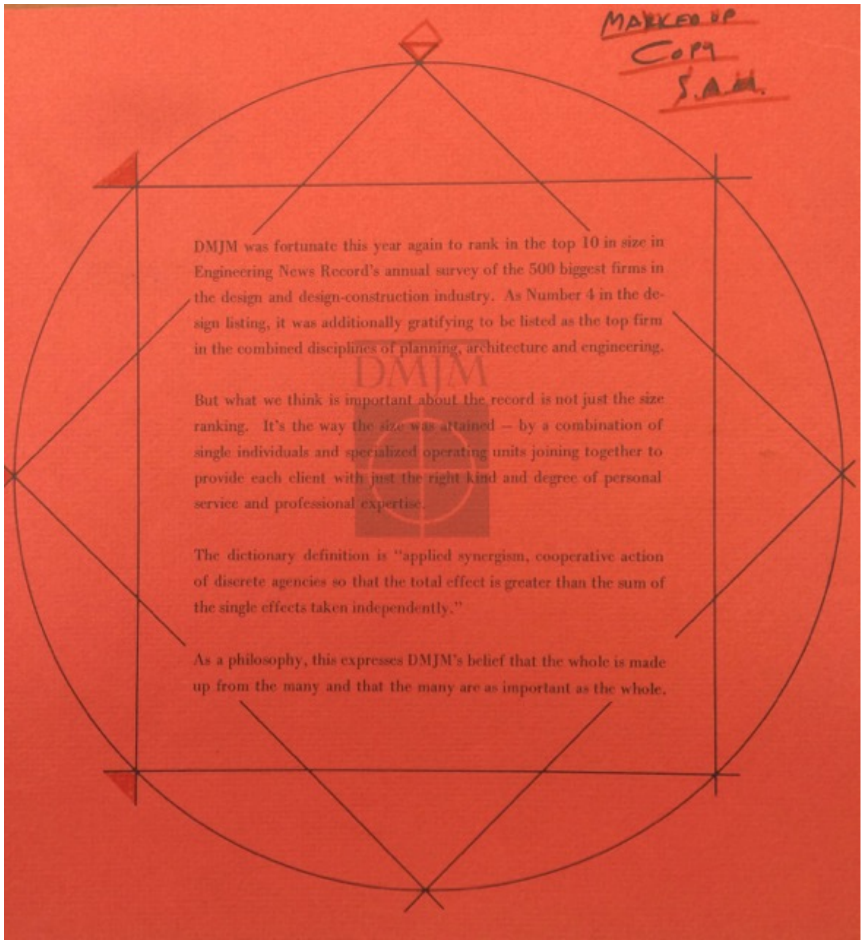


Figure 2.24

"The Money-Makers—and some losers," Cover of *Engineering News-Record* (May 18, 1961).



MARKED UP COPY S.A.M.

DMJM was fortunate this year again to rank in the top 10 in size in Engineering News Record's annual survey of the 500 biggest firms in the design and design-construction industry. As Number 4 in the design listing, it was additionally gratifying to be listed as the top firm in the combined disciplines of planning, architecture and engineering.

DMJM

But what we think is important about the record is not just the size ranking. It's the way the size was attained — by a combination of single individuals and specialized operating units joining together to provide each client with just the right kind and degree of personal service and professional expertise.

The dictionary definition is "applied synergism, cooperative action of discrete agencies so that the total effect is greater than the sum of the single effects taken independently."

As a philosophy, this expresses DMJM's belief that the whole is made up from the many and that the many are as important as the whole.

Figure 2.25

DMJM Memo about the firm's ranking in the *ENR* Top 500 Design Firms, 1968. Stanley A. Moe papers, Huntington Library and Archives, San Marino, CA.

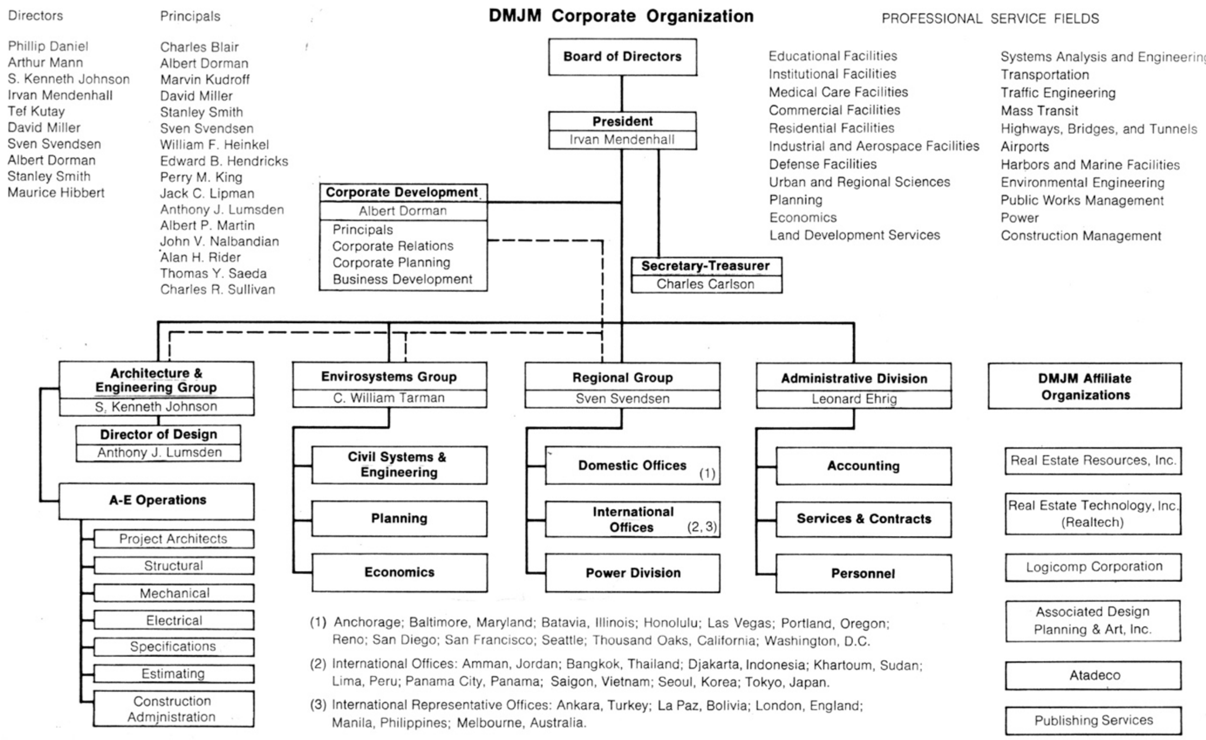


Figure 2.26

DMJM Corporate Organization Chart, 1972. From: *Progressive Architecture* 6 (June 1972), 78.

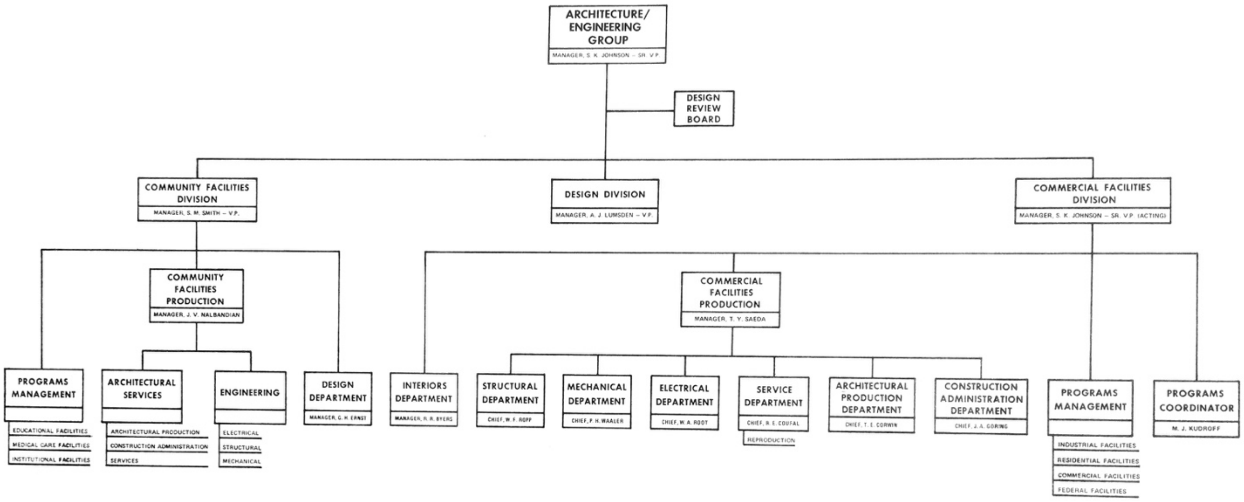


Figure 2.27

DMJM's Architecture/Engineering Group Organization Chart, 1972. Stanley A. Moe papers, Huntington Library and Archives, San Marino, CA.

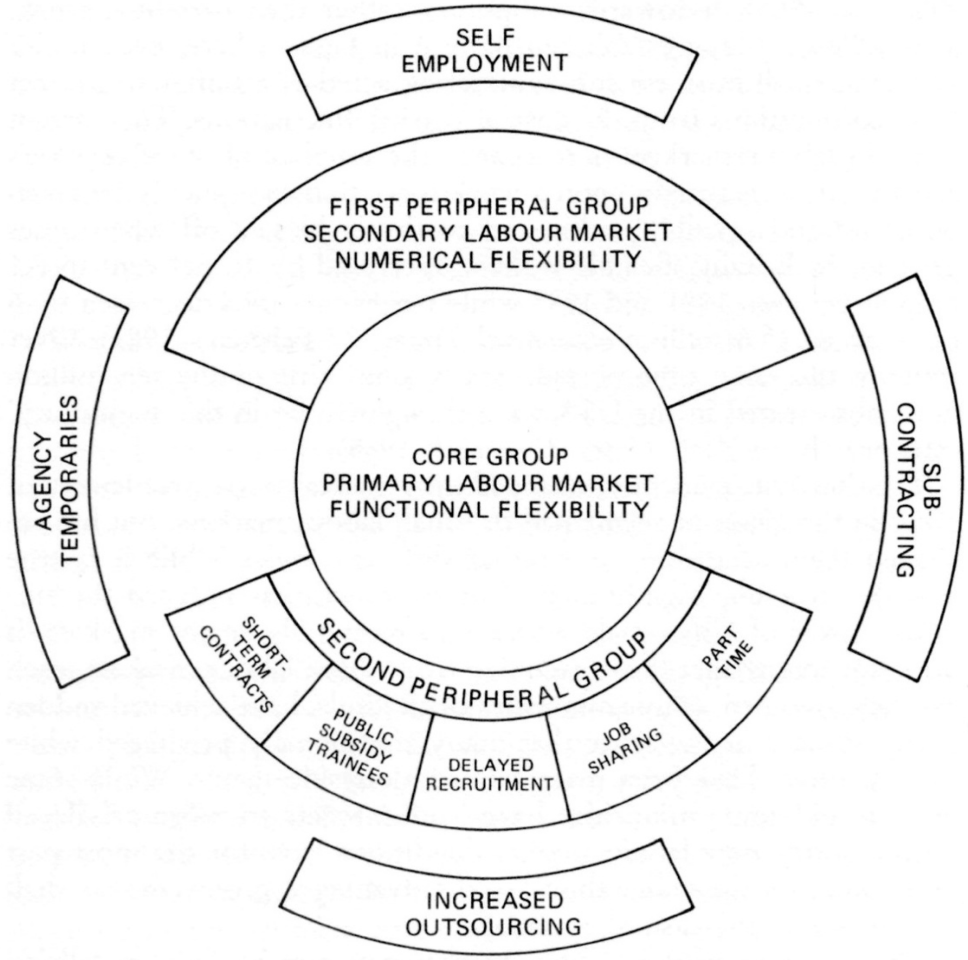


Figure 2.28

Diagram of labor market structures under "flexible accumulation." From: David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Oxford and Cambridge, MA: Blackwell, 1989), p. 151. Original drawing from "Flexible Patterns of Work," ed. Chris Curson (Institute of Personnel Management, 1986).

Figure 2.29

Albert Dorman assumes the role of President of DMJM, as featured with Irvan Mendenhall on the cover of *Engineering News-Record* (January 16, 1975).

umbers are not entirely comparable, ut they do show a trend in 1974.

But not all types of design companies ɔllowed this trend. The 42 architect-ɾal firms on the roster for two consecu-ive years cut their professional staffs by n average 14%. In total, 23 firms had ɛwer architects last year than in 1973, six remained the same, and 13 increased their professional staffs.

Those firms classifying themselves as architect-engineers returning to the list averaged a 6% increase in their professional staffs. Engineer-architect companies and consulting engineering firms on The ENR 500 both upped their professional staffs an average of 10%.

Within the three classifications of design firms that increased their professional staffs last year, those companies with billings greater than $30 million accounted for three-quarters of the total 3,852 professionals added.

Staff/billings boom. Average billings

. . top 446 design firms in 1974

Billings totaled $50 million or more

Rank	A year ago	Firm	Type of Firm #	Architectural	Civil eng.	Structural	Mechanical	Electrical	City plans	CM	Jobs abroad
1	1	Gilbert/Commonwealth Cos., Reading, Pa. & Jackson, Mich.	AE	+	+	+	+	+	+	+	+
2	2	Sargent & Lundy, Chicago, Ill.*	EA	+	+	+	+	+	.	+	+
3	5	Dames & Moore, Los Angeles, Calif.	ES	.	+	.	.	.	+	.	+
4	4	Planning Research Corp. Engrg. & Planning Group, Los Angeles, Calif. . . (a)	EAP	+	+	+	+	+	+	+	+
5	3	The Resource Sciences Corp., Tulsa, Okla. . . . (b)	EP	+	+	+	+	+	+	+	+
6	6	Chas. T. Main, Inc., Boston, Mass.	EA	+	+	+	+	+	.	+	+
7	9	Gibbs & Hill, Inc., New York, N. Y. . . . (c)	EA	+	+	+	+	+	+	+	+

Billings totaled $35 million to $49.9 million

Rank	A year ago	Firm	Type of Firm #	Architectural	Civil eng.	Structural	Mechanical	Electrical	City plans	CM	Jobs abroad
8	17	International Engineering Co., Inc., San Francisco, Calif. (d)	E	+	+	+	+	+	+	.	+
9	8	Black & Veatch, Kansas City, Mo.	E	+	+	+	+	+	+	+	+
10	18	Sverdrup & Parcel and Assoc., Inc., St. Louis, Mo.	EAP	+	+	+	+	+	+	+	+
11	7	Genge Inc., Los Angeles, Calif. . . . (e)	EAP	+	+	+	+	+	+	+	.
12	10	Howard, Needles, Tammen & Bergendoff, Kansas City, Mo. & New York, N. Y. . . . (f)	EAP	+	+	+	+	+	+	+	+

Billings totaled $25 million to $34.9 million

Rank	A year ago	Firm	Type of Firm #	Architectural	Civil eng.	Structural	Mechanical	Electrical	City plans	CM	Jobs abroad
13	11	Louis Berger Group of Cos., East Orange, N. J./Camp Hill, Pa.	EP	+	+	+	+	+	+	+	+
14	16	Michael Baker, Jr., Inc., Beaver, Pa.	EA	+	+	+	+	+	+	+	+
15	15	DeLeuw, Cather & Co., Chicago, Ill. . . . (g)	EP	+	+	+	+	+	+	+	+
16	13	Woodward-Clyde Consultants, Clifton, Kansas City, N. Y. C., Phila., Denver, Oakland, Los Angeles & San Diego	ES	.	+	.	.	.	.	.	+
17	19	A. Epstein & Sons, Inc., Chicago, New York, San Francisco, Phoenix, Paris, London, Tel-Aviv, Tokyo, Warsaw	EA	+	+	+	+	+	+	+	+
18	26	Lockwood Greene Engineers, Inc., New York, N. Y.	EA	+	+	+	+	+	+	+	+
19	20	CH2M HILL, Inc., Corvallis, Ore.	E	.	+	+	+	+	+	+	+
20	12	Skidmore, Owings & Merrill, Chicago, New York, San Francisco, Portland, Ore. & Washington, D.C.*	AE	+	+	+	+	+	+	.	+
21	14	URS Corp. Engineering Companies, San Mateo, Calif. . . . (h)	EAP	+	+	+	+	+	+	+	+
22	27	NUS Corp., Rockville, Md.	E	.	.	+	+	+	.	+	+
23	24	VTN Corp., Irvine, Calif.	EAP	+	+	+	+	+	+	+	+
24	22	Daniel, Mann, Johnson & Mendenhall, Los Angeles, Calif.	AEP	+	+	+	+	+	+	+	+
25	39	J. E. Sirrine Co., Greenville, S. C.	EA	+	+	+	+	+	+	.	.
26	21	Henningson, Durham & Richardson, Inc., Omaha, Neb.	AE	+	+	+	+	+	+	+	.

Billings totaled $20 million to $24.9 million

Rank	A year ago	Firm	Type of Firm #	Architectural	Civil eng.	Structural	Mechanical	Electrical	City plans	CM	Jobs abroad
27	25	CRS Design Assoc, Inc., Houston, Tex. . . . (i)	AEP	+	+	+	+	+	+	+	+
28	37	Camp Dresser & McKee Inc., Boston, Mass. . . . (j)	E	+	+	+	+	+	+	+	+
29	28	Harza Engineering Co., Chicago, Ill.	E	+	+	+	+	+	+	+	+
30	29	Giffels Assoc., Inc., Detroit, Mich.	AEP	+	+	+	+	+	+	+	+
31	31	The Firm of Dermot Reddy, New York, N. Y.	EA	+	+	+	+	+	.	+	+
32	38	Gannett, Fleming, Corddry & Carpenter, Inc., Harrisburg, Pa.	E	+	+	+	+	+	+	.	+
33	32	Sanderson & Porter, Inc., New York, N. Y. . . . (k)	EA	+	+	+	+	+	.	+	+
34	23	Tippetts-Abbett-McCarthy-Stratton, New York, N. Y.	EA	+	+	+	+	+	+	+	+
35	53	A. M. Kinney, Inc. & Affiliates, Cincinnati, Ohio	AE	+	+	+	+	+	.	+	+
36	33	Consoer, Townsend & Assoc., Chicago, Ill.	E	+	+	+	+	+	.	.	+

*Billings estimated by ENR. # KEY TO TYPE OF FIRM: A = Architect; E = Consulting engineer; AE = Architect-Engineer; EA = Engineer-Architect; S = Soils or geotechnical engineer; P = Planner. Firms classified themselves. a. Includes Frederic R. Harris, Inc.; Alan M. Voorhees & Assoc., Inc.; Toups Corp.; Engineering Consultants, Inc.; R. Dixon Speas Assoc., Inc.; Economics Research Assoc., Inc.; Berkus Group; H. B. Maynard International Inc.; PRC Systems Services Co.; Quinton-Redgate. b. Includes Holmes & Narver, Inc. and Williams Bros. Engrg. Co.; subsidiary of U. S. Filter Corp. c. Subsidiary of Dravo Corp. d. Subsidiary of Morrison-Knudsen Co., Inc. e. Includes Cahn Engrg.; Call Engrg.; Daverman Assoc.; McIntire & Quiros, Inc.; Meurer, Serafini & Meurer, Inc.; Morganelli-Heumann & Assoc.; The Murray-McCormick Environmental Group; Wheeler, Petterson & Coffeen. f. Includes Henry B. Steeg & Assoc.; Frankfurter Assoc., Inc.; Kivett & Myers; Stutsman Assoc. g. Subsidiary of TRW Inc. h. Includes John A. Blume & Assoc., Engrs.; Coverdale & Colpitts, Inc.; Forrest & Cotton, Inc.; Hewitt & Royer, Inc.; Hill, Ingmar, Chase & Co.; Madigan-Praeger, Inc.; The Ken R. White Co.; Pollution Control Engrg., Inc.; URS Energy Services Co. i. Includes Caudill Rowlett Scott; Stevens, Thompson & Runyan; A. A. Mathews; CM Assoc. j. Includes Ross, Saarinen, Bolton & Wilder, Inc.; Alexander Potter Assoc. Inc.; Camp Scott

continued

Billings/staff ratios jump

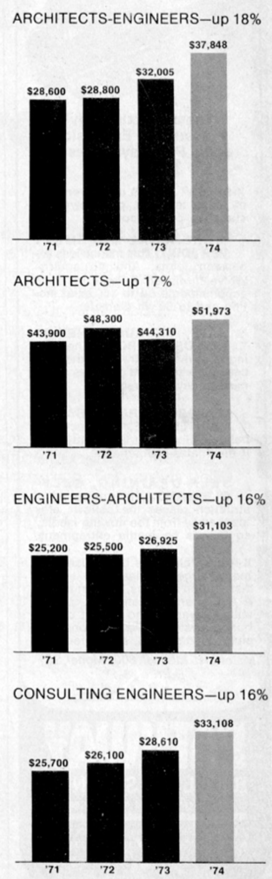


Figure 2.30

Subsidiary firms listed as footnotes within the "The Top 500 Design Firms," *Engineering News-Record,* (May 1975), p. 59.

ENR The Top 500 Design Firms

Designer affiliates and subsidiaries

Rank	Company	Affiliates and subsidiaries
(2)	Gibbs & Hill, Inc.,	Dravo Utility Constructor, Inc.
(4)	Gilbert/Commonwealth Cos.,	ENCON, Ltd. c/o Appleby, Spurling & Kempe; Gilbert Assoc.; Inter-America Consultants, Inc.
(5)	CH2M Hill, Inc.,	Engrg. Surveys of N. Calif., Inc.;
(6)	Planning Research Corp.,	DIT-Harris; HBA, SA; Martin & Voorhees Assoc., Ltd.; Polytecna Harris, S.p.A.; Read Voorhees & Assoc.
(7)	Sverdrup Corp.,	SPCM, Inc.; SPIRE Corp.
(8)	Black & Veatch,	Moore Gardner & Assoc., Inc.
(9)	Louis Berger Int'l., Inc.,	BERGIVOIRE, Abidjan, Ivory Coast; Brokonsult AB, Taby, Sweden; Development Economics Group, Inc.; Engeplan S.A., Geneva, Switzerland; Pavement Profiler, Inc.; SOTED, Lome, Togo
(11)	Daniel, Mann, Johnson, Mendenhall,	Technical Management Services, Inc.
(12)	De Leuw, Cather & Co.,	A sub. of the Parsons Corp.
(13)	Holmes & Narver, Inc.,	Resource Sciences Arabia, Ltd.
(15)	Howard Needles Tammen & Bergendoff,	Thomas K. Dyer, Inc.
(16)	Morrison-Knudsen Engineers, Inc.,	Previously Int'l. Engrg. Co., Inc.
(17)	Parsons Brinckerhoff, Inc.,	PB-KBB, Inc.; Pope Engineers
(19)	Camp Dresser & McKee Inc.,	Camp Scott Furphy Ltd.
(20)	Reynolds, Smith & Hills, Inc.,	Environmental Science & Engrg., Inc.; Intraspace Designers, Inc.; Lewis-Eaton, Inc.; McMinn Norfleet Wicker & Assoc., Inc.; Plantec Corp.; The Lewis Partnership; Trigon Const. Mgt., Inc.
(23)	Tetra Tech, Inc.,	Bois D'Arc Corp.; E.H. Richardson Assoc., Inc.; Hydro Products, Inc.
(29)	Hellmuth, Obata & Kassabaum, Inc.,	HOK + 4
(30)	A. Epstein & Sons, Inc.,	Architectural Interiors, Inc.; Stuart Laff Associates
(32)	Gannett Fleming,	Corddry Carpenter Dietz & Zack; GANCOM, Inc.
(34)	Greiner Engineering, Inc.,	Cahn SP Group; Daverman/SP Group; Genge Aerial Surveys, Inc.
(36)	Law Engineering Testing Co.,	LeRoy Crandall and Associates
(38)	James M. Montgomery, Consulting Engineers, Inc.,	Nielsen, Maxwell & Wangsgard, Inc.
(39)	McClelland Engineers, Inc.,	Newfoundland Geosciences, Ltd.; TERA, Inc.
(40)	Roy F. Weston, Inc.,	Environmental Engrs., Inc.
(41)	Quadrex Corp.,	Health Physics Systems, Inc.; Nevada Inspection Services
(42)	Lester B. Knight & Assoc., Inc.,	Keller & Gannon ; Knight Wegenstein
(44)	Giffels Associates, Inc.,	Hoyem-Basso Assoc., Inc.; John J. Harte Assoc., Inc.
(45)	Burns & McDonnell,	C. W. Nofsinger Co.
(51)	Engineering-Science, Inc.,	Aquatechnics, Inc.; ES Environmental Services, Inc.; Stepan & Assoc., Inc.
(54)	CE Maguire, Inc.,	LBC&W, Inc.
(56)	Ellerbe Associates, Inc.,	Planning & Management Services, Inc.
(57)	TCB Inc.,	Eldorado Engrg. Co.; SURVCON Inc.; Turner Collie & Braden Inc.; Western States Surveying, Inc.
(65)	Professional Service Industries, Inc.,	A&H Engrg. Corp.; Coleman Testing Laboratory, Inc.; Halpert Assoc., Inc.; Jay Evans Testing Laboratory, Inc.; Michigan Testing Engrs., Inc.; Shilstone Engrg. Testing Lab., Inc.; Soil Systems, Inc.; Walker Laboratories, Inc.
(69)	The Smith Group	Applied Environmental Research (SH&G) Comprehensive Mgt. Services, Inc.; Const. Economists Collaborative; IGS Design ; Johnson, Johnson & Roy, Inc.; Metz, Train & Youngren, Inc.; Moyer Assoc., Inc.; Murray Jones Murry, Inc.; NORR/SH&G, Ltd., Toronto, Ontario; Ryan, Cooke & Zuern Assoc., Inc.; Smith, Hinchman & Grylls Assoc., Inc.; Terra Dev. Corp. ; The Potomac Group; Value Mgt. Division (SH&G)
(72)	Michael Baker Corp.,	Aerial Map Service Co., Inc.; Touhill-Shuckrow Assoc.
(73)	The NBBJ Group,	Business Space Design; Management & Planning Services; Project & Cost Management
(85)	The Kuljian Corp.,	Corporate Data Systems; Development Consultants Int'l. Ltd., H.K.; Global Water & Power Systems, Inc.; O&M Services Co., Saudi Arabia
(86)	Kidde Consultants, Inc.,	Evans, Hagan & Holdefer, Inc.
(87)	Betz Converse Murdoch Inc.,	J. B. Converse & Co., Inc.; Milam/BCM Engrg., Inc.
(91)	STS Consultants, Ltd.,	STS D'Appolonia, Ltd.
(92)	Lockwood, Andrews & Newnam, Inc.,	Carter Engineers; Geogram Corp.
(97)	Edwards & Kelcey, Inc.,	Wyer, Dick & Co.
(101)	Frank Moolin & Associates, Inc.,	A sub. of ENSERCH Corp.
(112)	S & B Industries, Inc.,	Process Services, Inc.; Union Engrg. & Construction Co.
(116)	Coffman Engineers, Inc.,	Pettijohn Engrg. Co.
(117)	Everett I. Brown Co.,	A & E Engrg., Inc.; LANDECO, Inc.
(122)	The Hillier Group,	Design Interface
(128)	Elson T. Killam Associates, Inc.,	Duncan, Lagnese & Assoc., Inc.
(135)	L. Robert Kimball & Associates,	George B. Mebus, Inc.; Quinn Assoc.
(136)	Bovay Engineers, Inc.,	Dunbar & Dickson, Inc.
(138)	E. C. Jordan Co.,	Jordan Corrill Assoc.; Perkins-Jordan, Inc.; Stevens Archts.
(144)	Flad & Associates,	Affiliated Engineers, Inc.
(148)	The Cannon Corp.,	Interplan; Professional Construction Managers (PCM, Inc.)
(150)	TRA ,	Engrg. Consultants, Inc.
(174)	George S. Nolte & Associates,	Harl Pugh & Assoc.; Sharrah-Nolte & Assoc.
(177)	Psomas & Associates,	Southwest Engrg.
(188)	Booker Associates, Inc.,	Gralla Associates, Inc.
(189)	Petro-Marine Engrg., Inc.,	Ramboll & Hanneman, Denmark
(191)	HWH Affiliates, Inc.,	Barnes-Neiswander Assoc.; George W. Grant & Assoc.; Hoag-Wismar Partnership; William S. Watkins Assoc.
(196)	Foth & Van Dyke ,	Herziger & Assoc., Inc.; Technical Resources, Inc.
(199)	Ardaman & Associates, Inc.,	Saudi Geotechnical Services, Riyadh, Saudi Arabia
(209)	Hayes, Seay, Mattern & Mattern,	Palmer & Baker Engrs., Inc.
(217)	Russell & Axon, Inc.,	Research & Analytical Laboratories
(232)	Wade-Trim Group, Inc.,	Edmands Engrg., Inc.; Geotechnical & Materials Consultants,Inc.; Granger Engrg., Inc.; John Dziurman Assoc., Inc.
(233)	Schuchart & Associates, Inc.,	Sandwell Int'l.
(238)	Schoor, DePalma & Gillen, Inc.,	Canger, Schoor & Cassera, Inc.
(242)	ROSSER FABRAP International,	Chastain & Tindel, Inc.; Healy Hargan Matten, Inc.
(243)	Pacific Architects & Engineers, Inc.,	J. W. Romlein Co., Inc.
(250)	MMM Design Group,	Oliver, Smith & Cooke Reprographic Services, Inc.
(252)	Hoskins-Western-Sonderegger, Inc.,	Francis-Meador-Gellhaus, Inc.; Martinez Ortho-Mapping Corp.; Met-Chem Engrg. Laboratories, Inc.; Plains Engrg., Inc.
(257)	Lemco Engineers, Inc.,	LEI Consultants, Inc.; Scott & Scott Consultants, Inc.
(271)	Haley & Aldrich, Inc.,	H&A of New York
(275)	CUH2A,	Amar Consult., Cairo, Egypt; Arconstruct
(285)	The Ehrenkrantz Group, P.C.,	Building Conservation Technology
(288)	Hensley-Schmidt, Inc.,	A + E Design Group, Inc.
(298)	Petrocon, Inc.,	Delta Design, Inc.; E & I Systems, Inc.
(300)	Geologic Associates, Inc.,	MCI/Consulting Engrs.
(319)	Burt Hill Koser Rittelmann Associates,	Paul Planert Design Associates
(327)	Perez Ltd.,	Caplinger Planners; Const. Planning Assoc. ; Dessin Petit; Engrg. Planning Group, Inc.; Interior Planning Assoc. ; Robert Tannen, Inc.
(342)	LEA Group ,	Hoyle Tanner & Assoc., Inc.
(348)	Wagner Associates, Inc.,	Frankhouser-Jenkins Assoc.
(350)	F. Robert Bell & Associates,	Bell Lavalin, Inc.; Ninilchik Technical Services; Pacific Design Group
(351)	Dufresne-Henry, Inc.,	Webster Martin, Inc.
(362)	The Williams & Works Cos.,	EDI Engrg. & Science, Inc.; W&W Facilities Group, Inc.
(363)	Blum Consulting Engineers,	Consolidated Engrs., Inc.
(364)	The Falick/Klein Partnership, Inc.,	Formerly FBSR
(367)	Leedshill-Herkenhoff, Inc.,	Gordon Herkenhoff & Associates; Leeds, Hill & Jewett
(371)	The BSC Group,	Formerly Boston Survey Consultants, Inc.
(383)	Urban Engineers, Inc.,	Olson & Terzian
(393)	SEA Engineers/Planners,	Great Basin Aerial Surveys
(416)	Rist-Frost Associates, P.C.,	Mechanical Electrical Systems, Inc.
(418)	TSP Group, Inc. ,	Delpro Corp.; Design Concepts, Inc.
(429)	Binkley & Holmes, Inc.,	Baseline Corp.; Landev Engrs., Inc.
(438)	Pate Engineers, Inc.,	GP Surveyors, Inc.
(466)	J-U-B Engineers, Inc.,	Aerial Mapping Co.
(490)	Winzler & Kelly Consulting Engrs.,	Electrical Design, Inc.; Walters & Beyer Civil Consult. Engrs.

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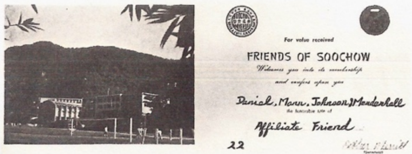
Figure 2.31

Full spreads of subsidiary firms listed in "The Top 500 Design Firms," *Engineering News-Record*, (May 1985), p. 60.

SOCIAL NOTES FROM ALL OVER OR, HOW TO BE

AN AFFILIATE FRIEND



An eight-member group of the Pacific Community Center project development spent a week in Taiwan recently tying up details before getting construction underway in Anaheim in May. From left, they included: Tracy Price DMJM Project Director and duenna for the project; Lu Kuo-hua, Chinese National Assemblyman; George Pratt, Vice President of United California Bank; George Page, President, Incentive Foundation, Land Owners; George Yarbenet, Vice President Transnation Development Co.; T. K. Kutay, DMJM Managing Executive Vice President; Maynard Kambak, President of PCCI and leader of the group; Alan Osborn, Director of Development Service of the City of Anaheim.

* * * * *

photo by A. Kruskkhar

Economists and planners are notorious for the close differences that exist among them. An extreme, but good natured example was last Fall's initiation of the planning project for the City of Eureka by the DMJM/San Francisco Urban and Regional Sciences group. Art Auble, economist and head of the group, threatens planner George Wolfson with instant dunking in the colorful waters of Eureka Bay, as suitable initiation rites.

DMJM's Pacific Community Center project in Anaheim promises to be one of the most exciting and multi-faceted projects to hit the firm in many a year. Envisioned as the Oriental center of the west coast, with shops, international trade bazaars and offices, cultural and entertainment/hotel facilities, it is a joint development of U.S. and Asian nation private industries. Its first phase will be a center for the Republic of China (Taiwan), with all the domestic and international merchants and participators already signed on and detailed planning beginning for facilities. Client Maynard Kambak, Project Director Tracy Price and Principal T. K. Kutay made a recent trip to Taiwan to work on final details of contracts and meet some of the Chinese affiliates in the project. Out of this association came an invitation to the firm from the Soochow University to become a member of the Friends of Soochow carrying the distinguished title of "Affiliate Friend," an honor the firm values and respects.

* * * * *

Enjoying pupus and DMJM/Hawaii hospitality earlier this year were friends of the firm honoring the new offices required by increased activities in the Honolulu branch. Present were all DMJM/Hawaii staff members, V.P.J.C. Lipman and wife, and visiting principal Arthur E. Mann along with clients, officials and friends.

* * * * *

Much milder welcome was extended by the Ehrig family (Len Ehrig, Controller) and specifically by eight year old Katy Ehrig to DMJM Bolivian representative, General Paz Soldan, on a visit to Disneyland.

Figure 2.32

DMJM newsletter describing "How to be an affiliate friend." From: *DMJM Personnel*, (1970), p. 2. CSU Dominguez Hills Special Collections, Dominguez Hills, CA.

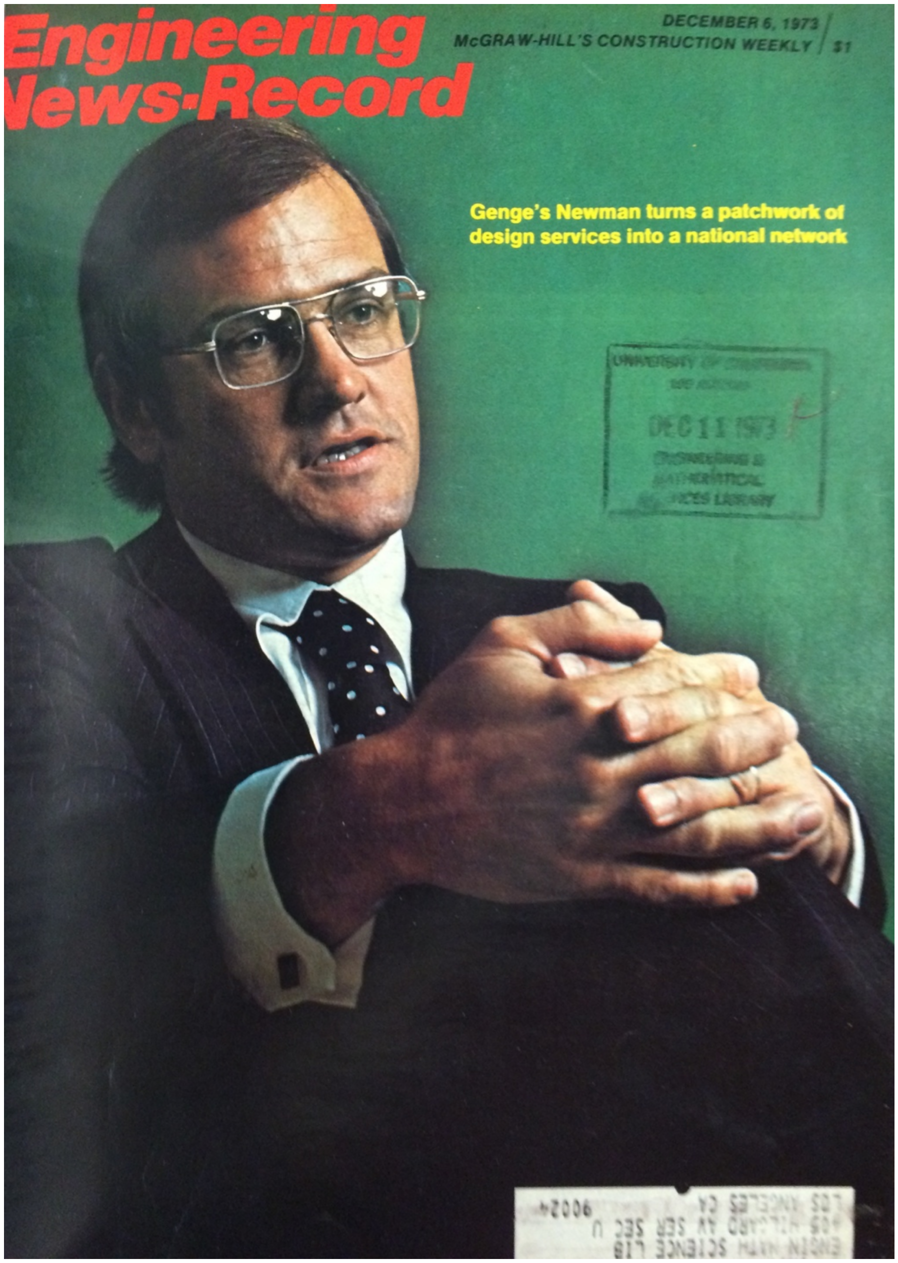


Figure 2.33

Richard Newman featured on the cover of *Engineering News-Record* for his assembling of a "stable of firms" known as the engineering firm Genge. From: *Engineering News-Record* (December 6, 1973).

Figure 2.34

One Park Plaza DMJM Office Building, Los Angeles, 1971. Photo by Wayne Thom. From: *Progressive Architecture* 6 (June 1972), p. 82.

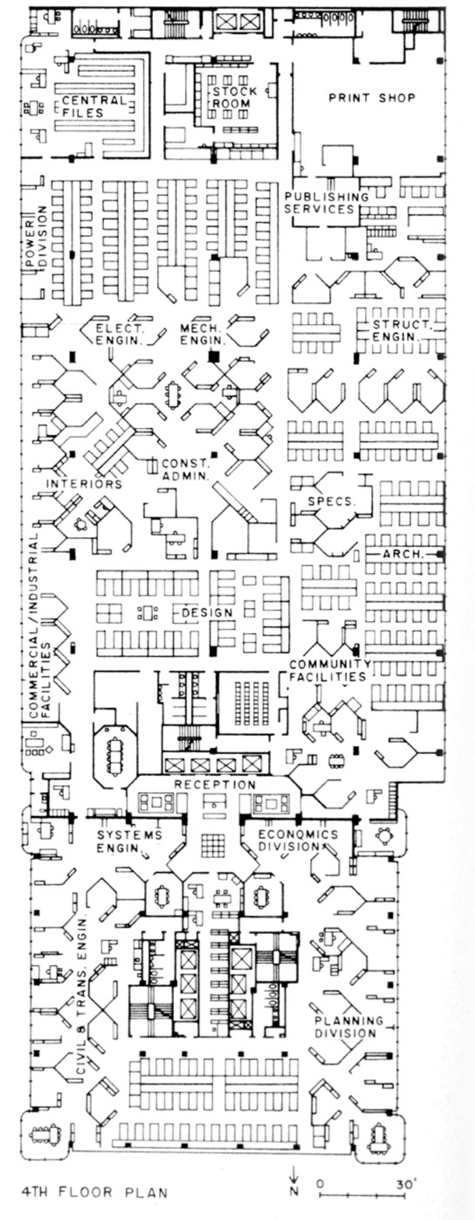


Figure 2.35

Fourth floor plan of DMJM's office in One Park Plaza, Los Angeles, CA, 1971. From: Progressive Architecture 6 (June 1972), p. 82.

Data Processing Firm Acquired

The computer service firm of Logicomp Corp., 3250 Wilshire Blvd., has been acquired by Daniel, Mann, Johnson & Mendenhall, architects, engineers and planners, as a wholly owned subsidiary.

Since its founding five years ago, Logicomp, working in conjunction with DMJM has developed an advanced business reporting and control system for business, engineering and scientific work.

The acquisition is believed to be the first time a Los Angeles-based architectural/engineering firm has gone so heavily into data processing.

Figure 2.36

News clipping about Logicomp's acquisition by DMJM, 1975. From: *Los Angeles Times,* Sept. 21, 1975, p. F25.

Solving models may prove extremely tedious, or even impossible, manually. Computer technology is employed to accelerate solutions and increase the number of alternatives that can be considered. It is not synonymous with systems, but in many cases it expands the opportunity systems has to reach valid conclusions. DMJM's Computer Services Center in Los Angeles provides a firm-wide programming capability for client applications at maximum speed and minimum cost.

Computer Services Center—On command, DMJM's Univac 9300 Data Communication System can be pulsed with any one of three Univac 1108 systems, the DMJM installation performing input/output functions and the 1108 providing its computation and storage capabilities. As required by workload, a Univac Data Communication Terminal 2000 is being phased into each regional office operation, giving that office ready access either to the Los Angeles 9300 system or to the nearest 1108 system.

Figure 2.37

Women operate DMJM's Univac 9200 Data Communication System as part of secretarial labor. DMJM "Systems" Brochure, undated. CSU Dominguez Hills Special Collections, Dominguez Hills, CA.

Figure 2.38

Business cards of architect William Coburn document the multiplicity of positions, including with joint-ventures and subsidiaries. W. Coburn Papers, Los Angeles, CA.

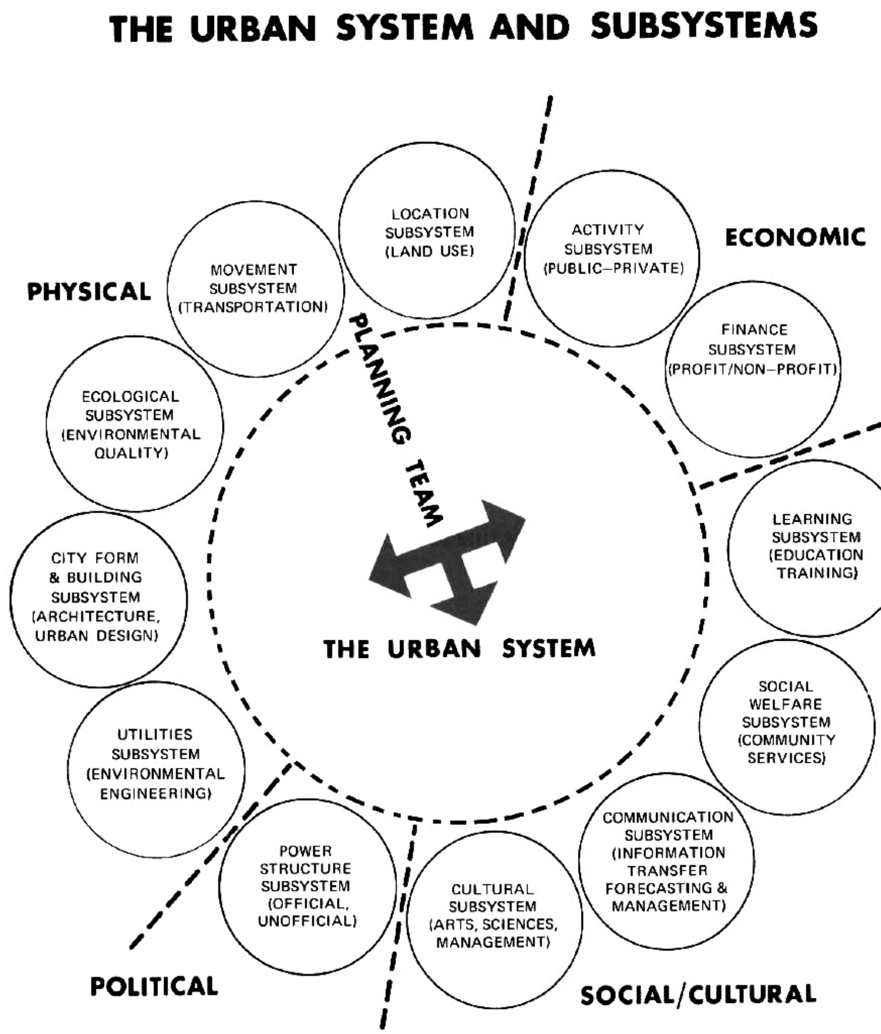


Figure 2.39

"The Urban System and Subsystems," as outlined in: DMJM's *Proposal for an Experimental City in Minnesota*, 1968. CSU Dominguez Hills Special Collections, Dominguez Hills, CA.

Figure 2.40

"SUPERAMERICA" Gasoline Station printed on the cover of Ashland Oil Company, *Annual Report* (1983).

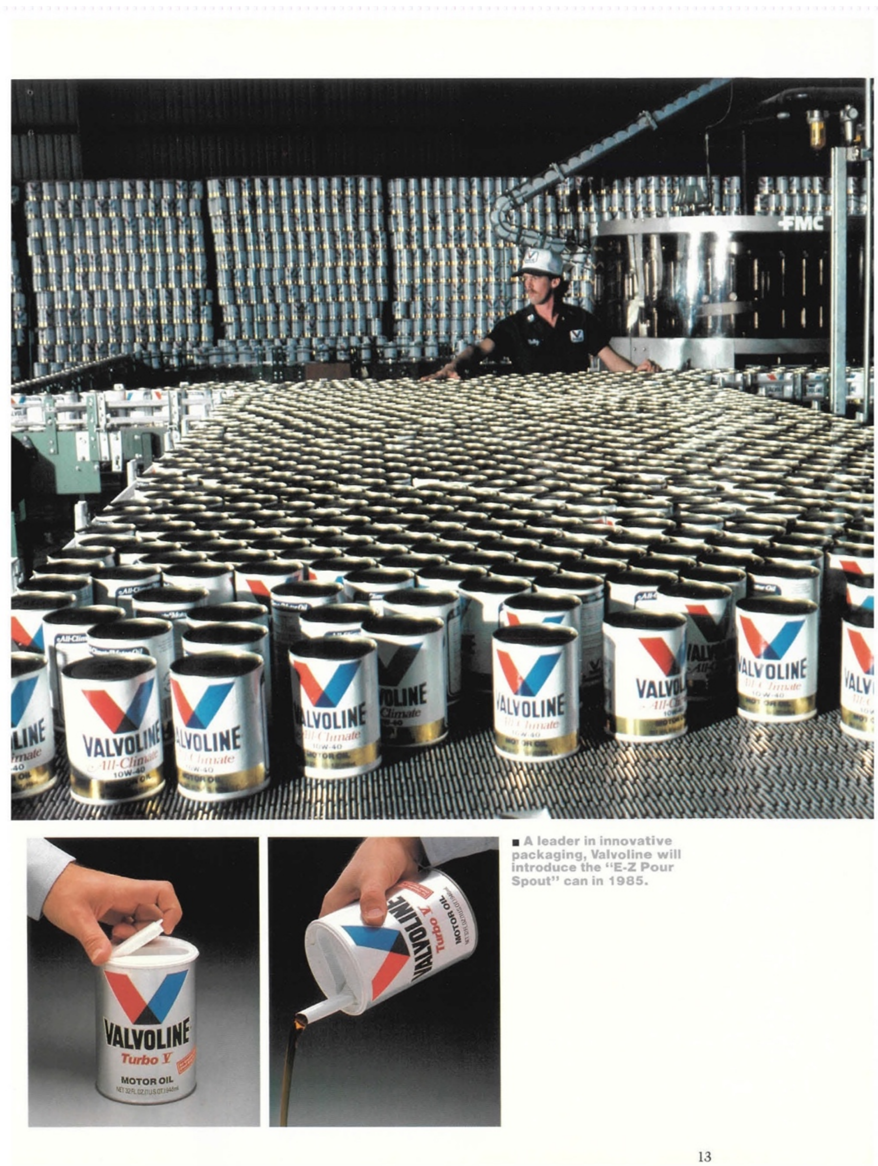
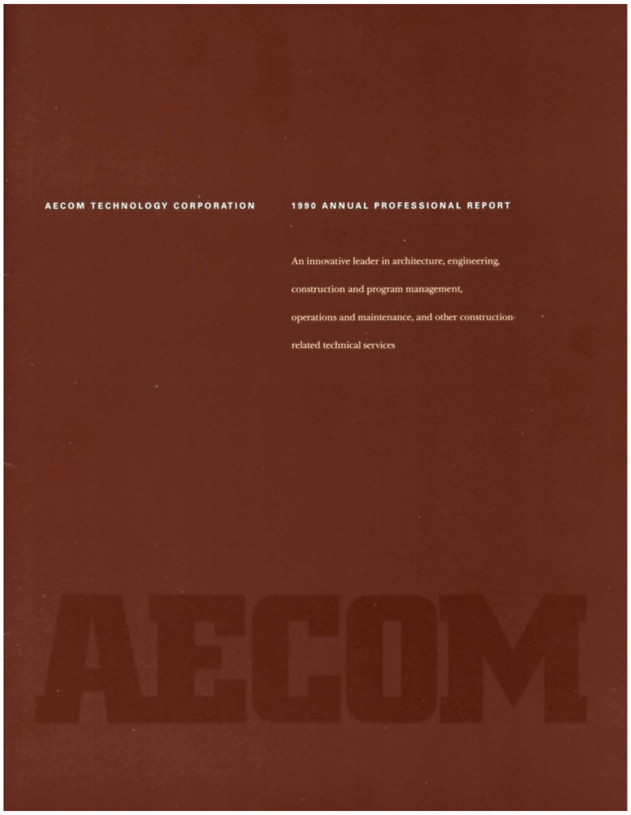
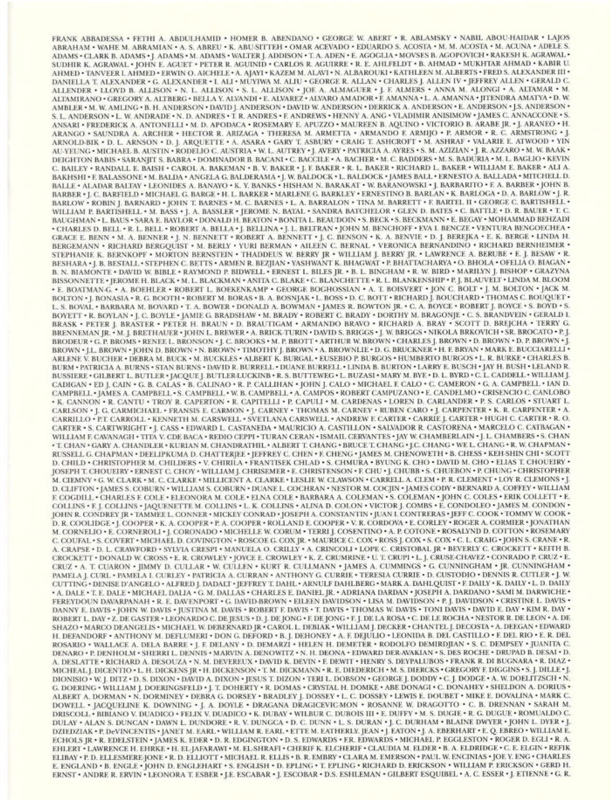


Figure 2.41

Ashland Oil promotes the volume of production of Valvoline Oil in its Annual Report to shareholders. From: *Ashland Oil Annual Report* (1984).





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ABRAHAM • WAHE M. ABRAMIAN • A. S. ABREU • K. ABU-SITTEH • OMAR ACEVADO • EDUARDO S. ACOSTA • M. M. ACOSTA • M. ACUNA • ADELE S.
ADAMS • CLARK B. ADAMS • J. ADAMS • M. ADAMS • WALTER J. ADDISON • T. A. ADEN • E. AGOGLIA • MOVSES B. AGOPOVICH • RAKESH K. AGRAWAL •
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AMBLER • M. W. AMLING • B. H. ANDERSON • DAVID J. ANDERSON • DAVID W. ANDERSON • DERRICK A. ANDERSON • E. ANDERSON • J.S. ANDERSON •
S. L. ANDERSON • L. W. ANDRADE • N. D. ANDRES • T. R. ANDRES • F. ANDREWS • HENNY A. ANG • VLADIMIR ANISIMOW • JAMES C. ANNACCONE • S.
ANSARI • FREDERICK A. ANTONELLI • M. D. APODACA • ROSEMARY E. APUZZO • MAUREEN B. AQUINO • VICTORIO B. ARABE JR. • J. ARANEO • H.
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AU-YEUNG • MICHAEL B. AUSTIN • RODELIO C. AUSTRIA • W. L. AUTREY • J. AVERY • PATRICIA A. AYRES • S. M. AZIZIAN • J. R. AZZARO • M. W. BAAK •
DEIGHTON BABIS • SARANJIT S. BABRA • DOMINADOR B. BACANI • C. BACCILE • A. BACHER • M. C. BADDERS • M. S. BADURIA • M. L. BAGLIO • KEVIN
C. BAILEY • RANDALL E. BAISH • CAROL A. BAKEMAN • B. V. BAKER • J. F. BAKER • R. L. BAKER • RICHARD L. BAKER • WILLIAM E. BAKER • ALI A.
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WILLIAM P. BARTISHELL • M. BASS • J. A. BASSLER • JEROME N. BATAL • SANDRA BATCHELOR • GLEN D. BATES • C. BATTLE • D. R. BAUER • T. C.
BAUGHMAN • L. BAUS • SARA E. BAYLOR • DONALD H. BEATON • BONITA L. BEAUDOIN • S. BECK • S. BECKMANN • E. BEGAY • MOHAMMAD BEHZADI
• CHARLES D. BELL • R. L. BELL • ROBERT A. BELLA • J. BELLINA • J. L. BELTRAN • JOHN M. BENCHOFF • EVA I. BENCZE • VENTURA BENGOECHEA •
GRACE E. BENN • M. A. BENNER • J. N. BENNETT • ROBERT A. BENNETT • J. C. BENSON • K. A. BENVIE • D. J. BEREJKA • E. K. BERGE • LINDA H.
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BESHARA • J. B. BESTALL • STEPHEN C. BETTS • ARMEN R. BEZJIAN • YASHWANT K. BHAGWAT • P. BHATTACHARYA • O. BHOLA • OFELIA O. BIAGAN •
B. N. BIAMONTE • DAVID W. BIBLE • RAYMOND P. BIDWELL • ERNEST L. BILES JR. • B. L. BINGHAM • R. W. BIRD • MARILYN J. BISHOP • GRAZYNA
BISSONNETTE • JEROME H. BLACK • M. L. BLACKMAN • ANITA C. BLAKE • C. BLANCHETTE • R. L. BLANKENSHIP • P. J. BLAUVELT • LINDA M. BLOOM
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ARLENE V. BUCHER • DEBRA M. BUCK • M. BUCKLES • ALBERT K. BURGAL • EUSEBIO P. BURGOS • HUMBERTO BURGOS • L. R. BURKE • CHARLES B.
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Figure 2.42

AECOM Technology Company First Annual Professional Report (1990). W. Coburn Papers, Los Angeles, CA.

Figure 3.0

Steuart Motor Company Building, Washington, DC., ca. 1955, in which the CIA's National Photographic Interpretation Center (NPIC) was located. US National Geospatial-Intelligence Agency.

Figure 3.1

Students at the School of Architecture at the University of Southern California were featured in a course about stage sets and costume design for the motion-picture industry. Photo by J. B. Ward. From: *Los Angeles Times*, January 1, 1928, p. G4.


S. KENNETH JOHNSON
President

SCARAB

NATIONAL PROFESSIONAL ARCHITECTURE FRATERNITY

C. Raymond Johnson
Hilyard Brown
Charles Crispin
Phillip J. Daniel
Fred Eley
S. Kenneth Johnson
Robert McClain
Robert Raetze
Paul Sackett

Brown, Daniel, Eley
McClain, Raetze, Sackett

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Figure 3.2

DMJM’s S. Kenneth Johnson and Phillip Daniel pictured with their National Professional Architecture Fraternity at the University of Southern California, among classmates including soon-to-be Hollywood Art Director Hilyard Brown, 1937. Courtesy Jim Daniel.

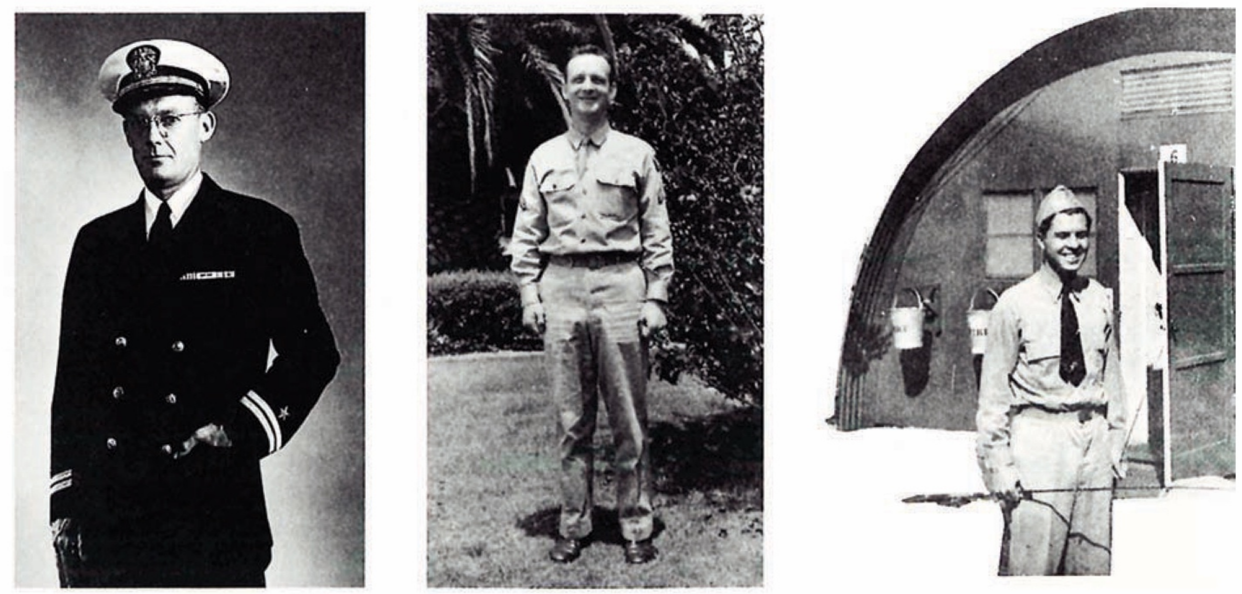


Figure 3.3

DMJM's Phillip Daniel, Arthur Mann, and Irvan Mendenhall photographed in military uniform. From: *1946-1955 Daniel, Mann, Johnson, & Mendenhall* (Los Angeles, CA, n.d.), AECOM company archives, Los Angeles, CA.

Figure 3.4

Ken Johnson returns from a trip to England with a material record of the time and place: a sample of London’s “fog” to compare with LA’s “smog.” From: *Los Angeles Examiner*, USC Library Special Collections, Los Angeles, CA, 1952.

Figure 3.5

DMJM's Japan Office, ca. 1965. From: *Company General Brochure: A Presentation of the Work of Daniel, Mann, Johnson, & Mendenhall*, 1967. Stanley A. Moe papers, Huntington Library, San Marino, CA.

Figure 3.6

DMJM's "Okinawa Team." From: *1946-1955 Daniel, Mann, Johnson, & Mendenhall* (Los Angeles, CA, n.d.), AECOM company archives, Los Angeles, CA.

Figure 3.7

DMJM's Washington, DC office, ca. 1965. From: *Company General Brochure: A Presentation of the Work of Daniel, Mann, Johnson, & Mendenhall*, 1967. Stanley A. Moe papers, Huntington Library, San Marino, CA.

Figure 3.8

DMJM's Company airplane, operated under "DMJM Aerial & Associates," n.d. From: *DMJM: Four Decades of Excellence,* 1986. W. Coburn Papers, Los Angeles, CA.

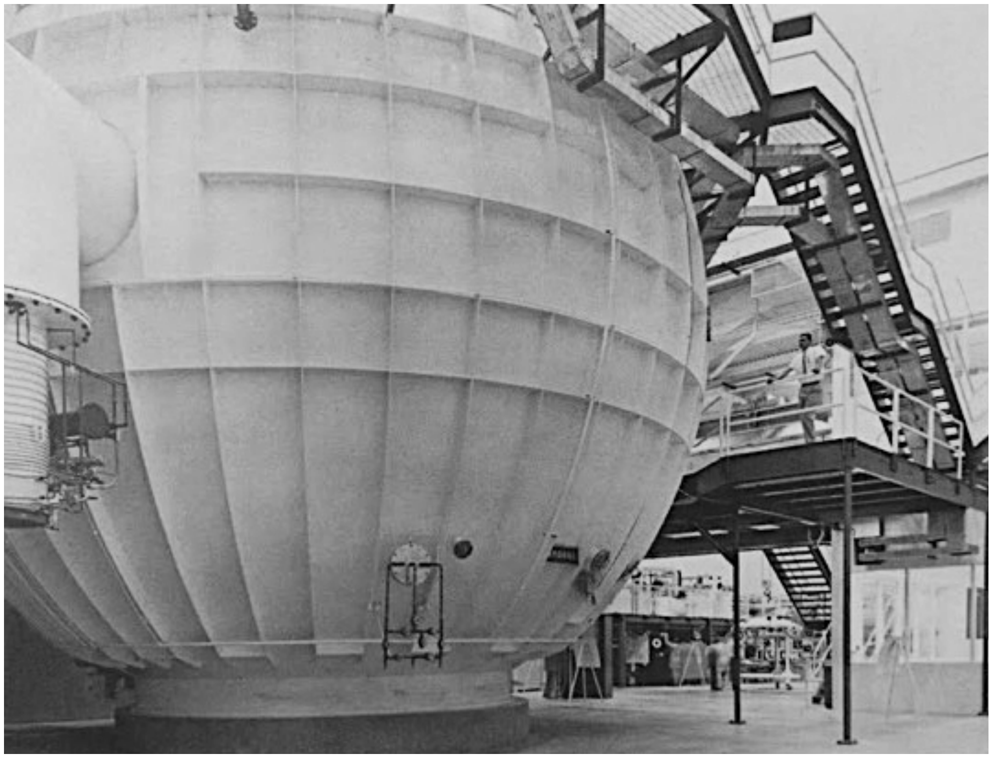


Figure 3.9

Space Simulation Chamber, Douglas Space Systems Center, Huntington Beach, CA.
Stanley A. Moe papers, Huntington Library, San Marino, CA.

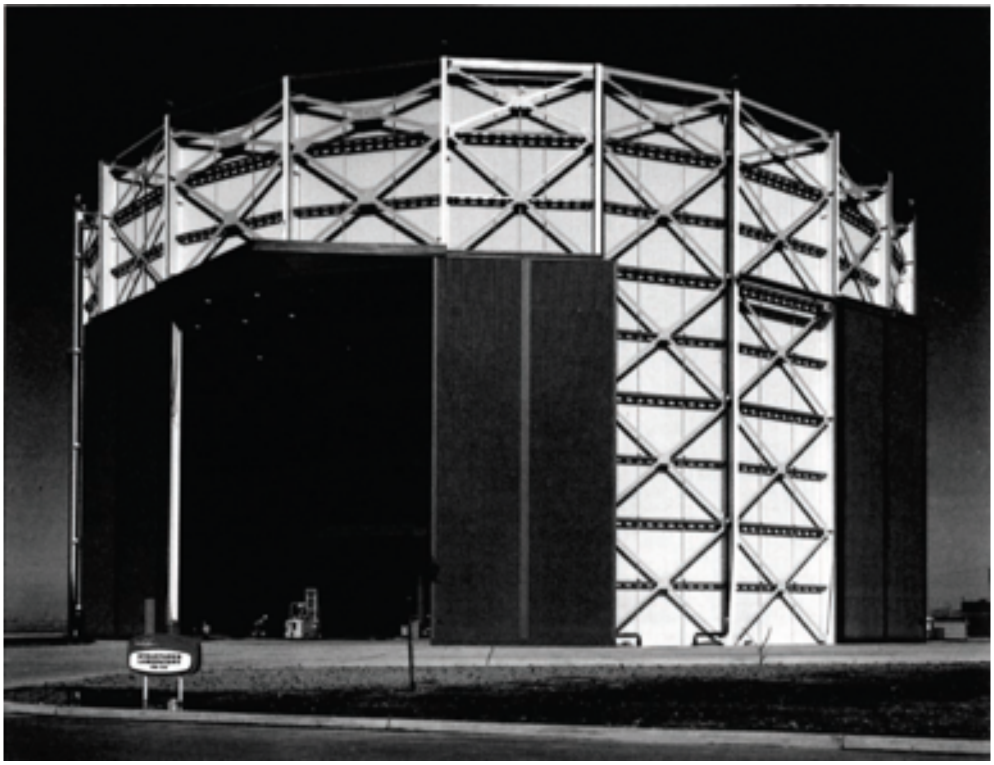


Figure 3.10

Structures Test Laboratory, Douglas Space Systems Center, Huntington Beach, CA. Stanley A. Moe papers, Huntington Library, San Marino, CA.

Figure 3.11

Douglas Aircraft Company, Huntington Beach, CA. Across 245 acres, the site included two Engineering and Administration Buildings, a Systems Integration Laboratory, Production test Laboratory, Space Simulation Laboratory, and a Cafeteria. Stanley A. Moe papers, Huntington Library, San Marino, CA.

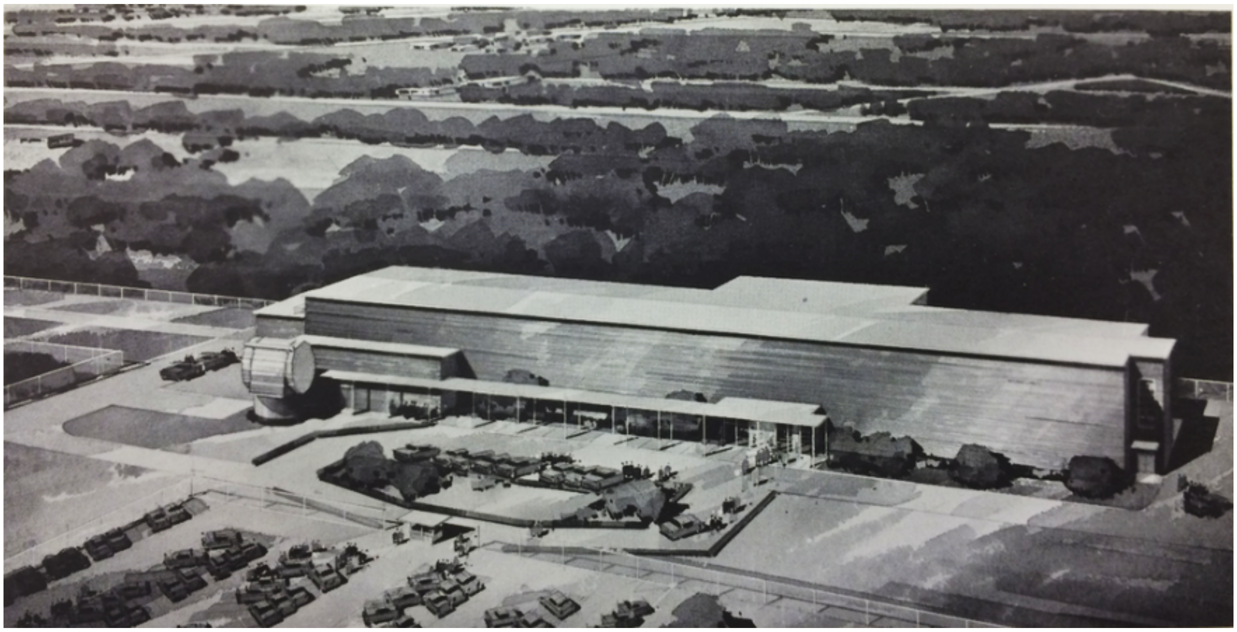


Figure 3.12

Ground Support Facility, Cape Kennedy (now Cape Canaveral). Stanley A. Moe papers, Huntington Library, San Marino, CA.

Figure 3.13

Test Stand and Ground Support Facility, Cape Kennedy (now Cape Canaveral). The design included testing, training, launching, and operating facilities. Stanley A. Moe papers, Huntington Library, San Marino, CA.

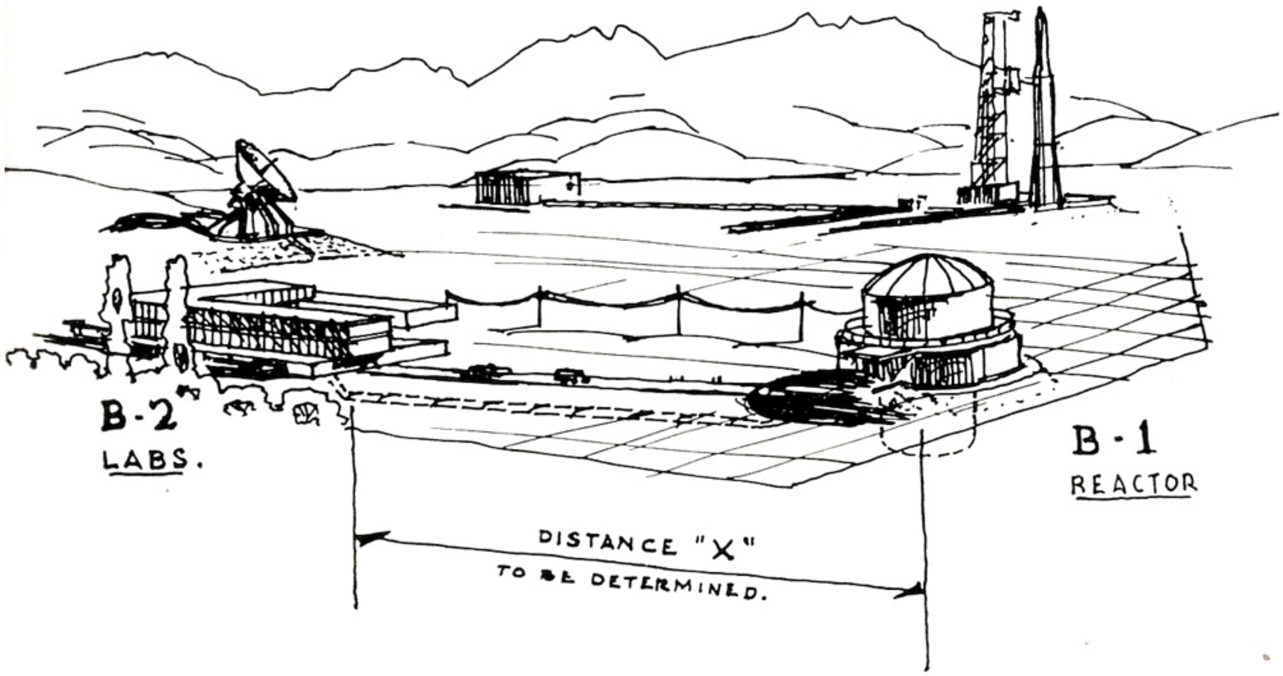


Figure 3.14

Phillip Daniel's diagram of how mathematical "proof" could be used to calculate distances between buildings. From: *Aerospace Engineering* (June 1961).

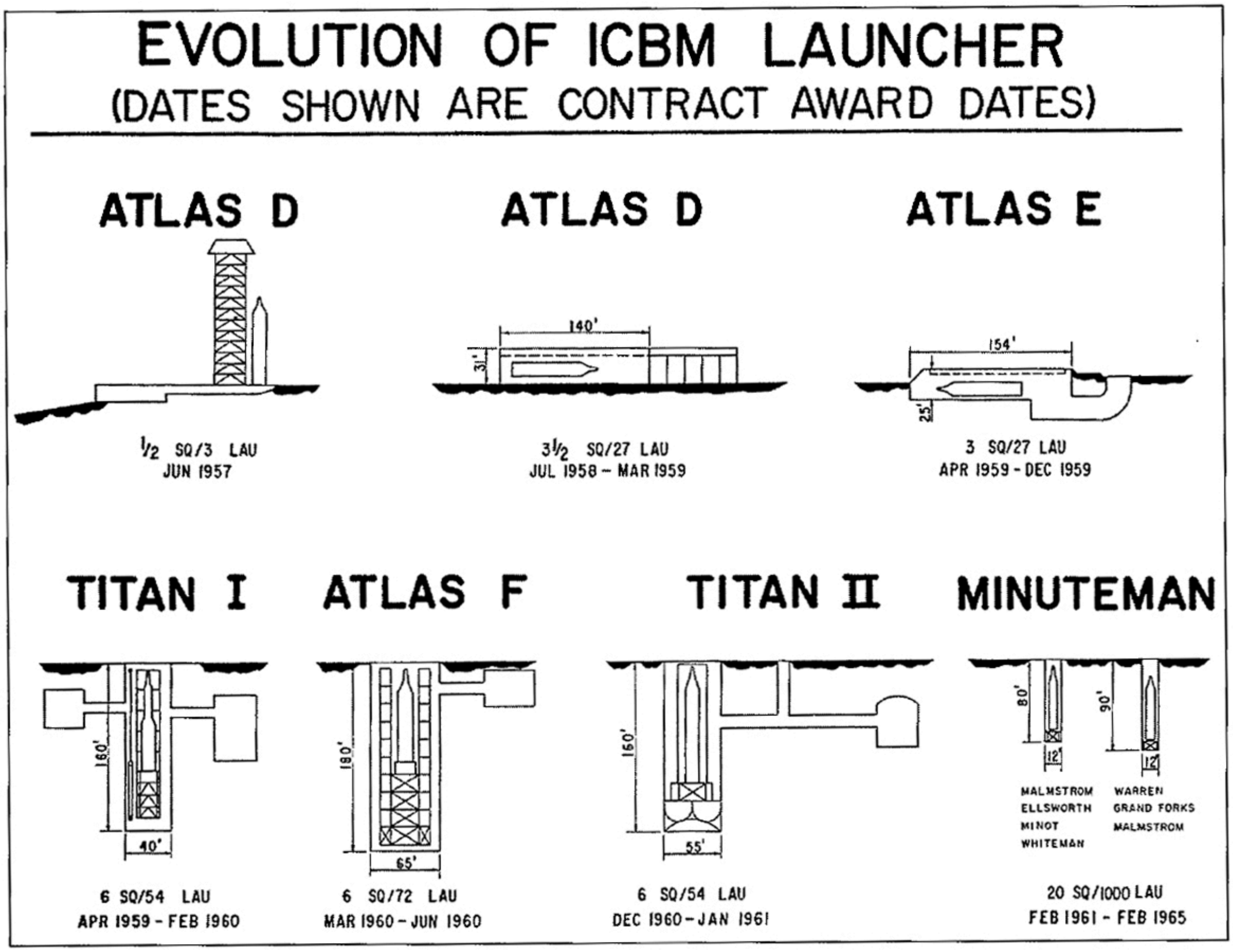


Figure 3.15

Evolution of Atlas and Titan ICBMs in section. From: John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Washington, DC: Department of Defense, 1996).

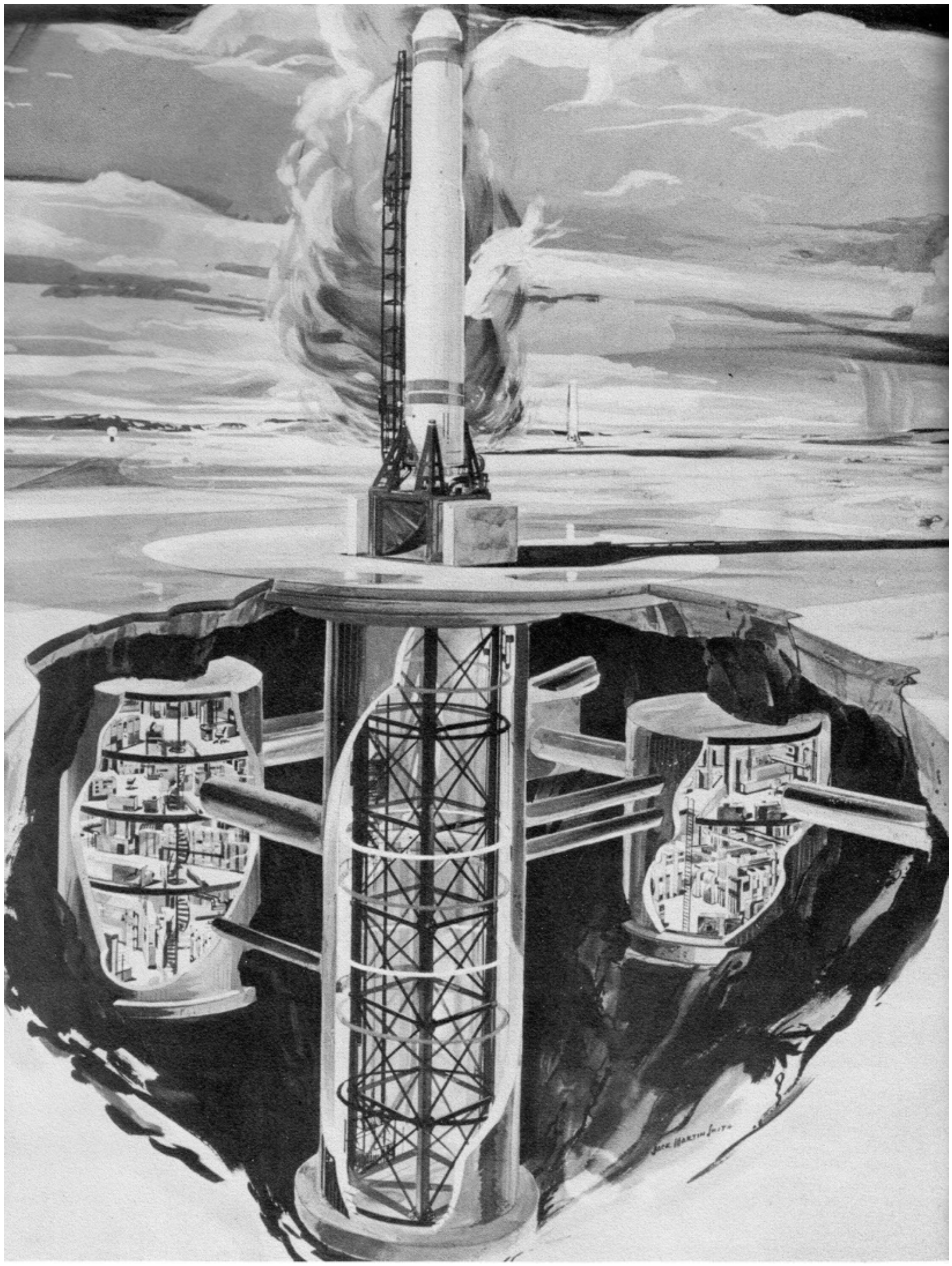


Figure 3.16

Rendering of a Titan I missile launcher by Jack Martin Smith. From: *A Presentation of the Work of Daniel, Mann, Johnson, & Mendenhall: Company General Brochure*, 1967. Stanley A. Moe papers, Huntington Library, San Marino, CA.

Figure 3.17

Pre-production drawing by Jack Martin Smith of Emerald City for *The Wizard of Oz,* ca. 1939. From: Production Design Drawing Collection, Margaret Herrick Library, Academy of Motion Picture Arts and Sciences, Beverly Hills, CA.

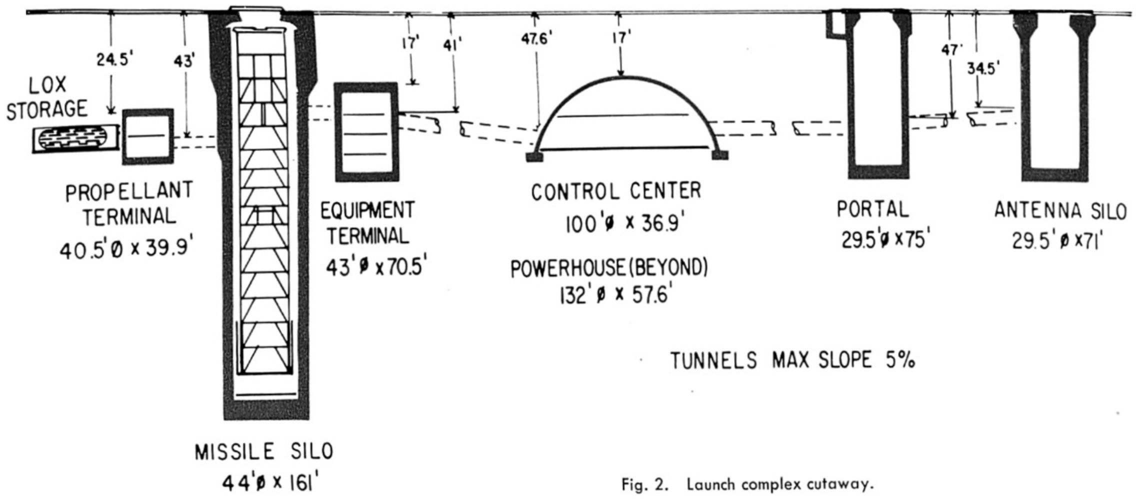


Figure 3.18

Section diagram of an operational, fully hardened, Titan I ICBM complex. From: Kudroff, Marvin J. "The First Titan Hardened Facilities." From: *Aerospace Engineering* (June 1961).

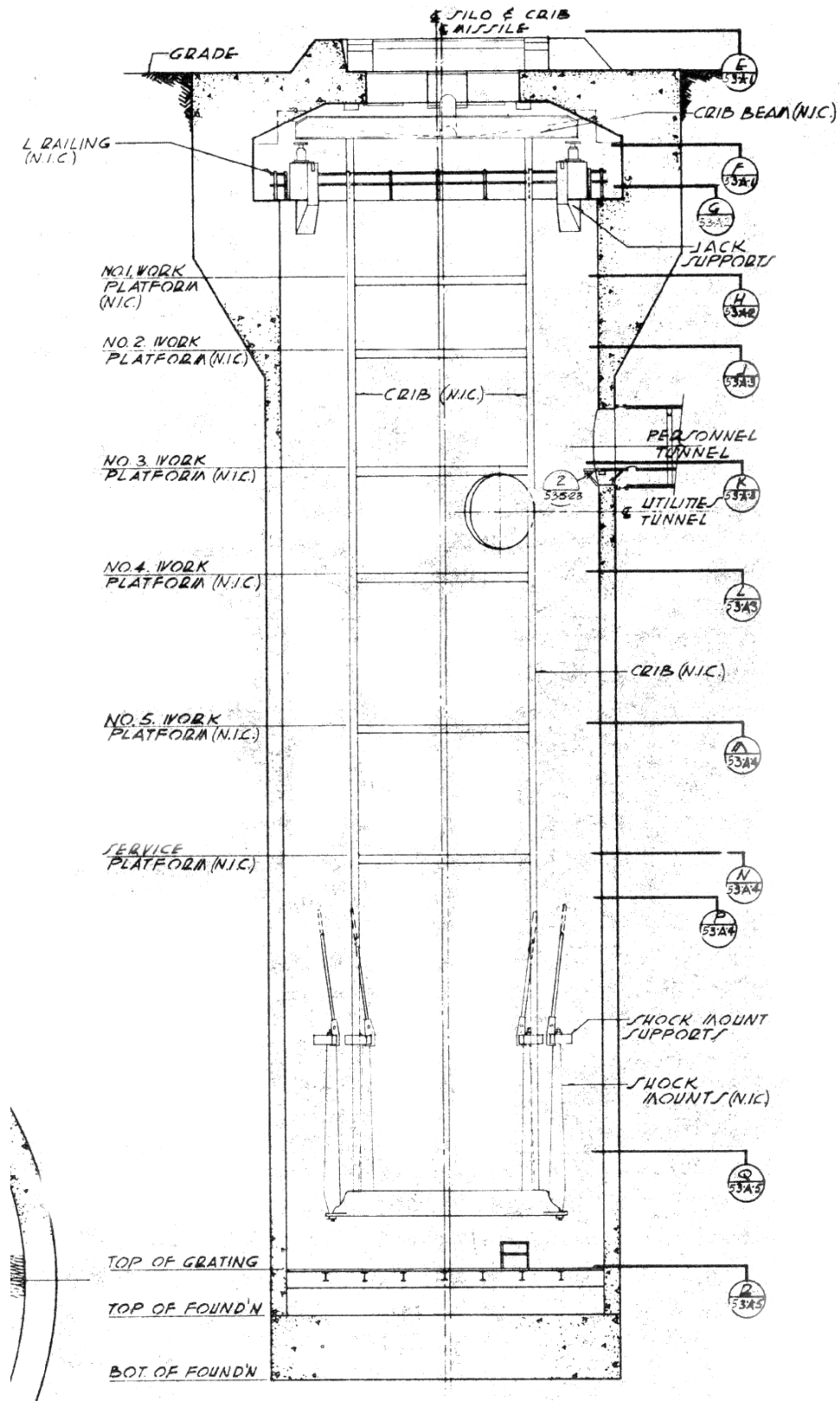


Figure 3.19

Section of fully hardened Titan I ICBM silo, Lowry Air Force Base, Colorado, 1959. Courtesy Pete Flickytail.

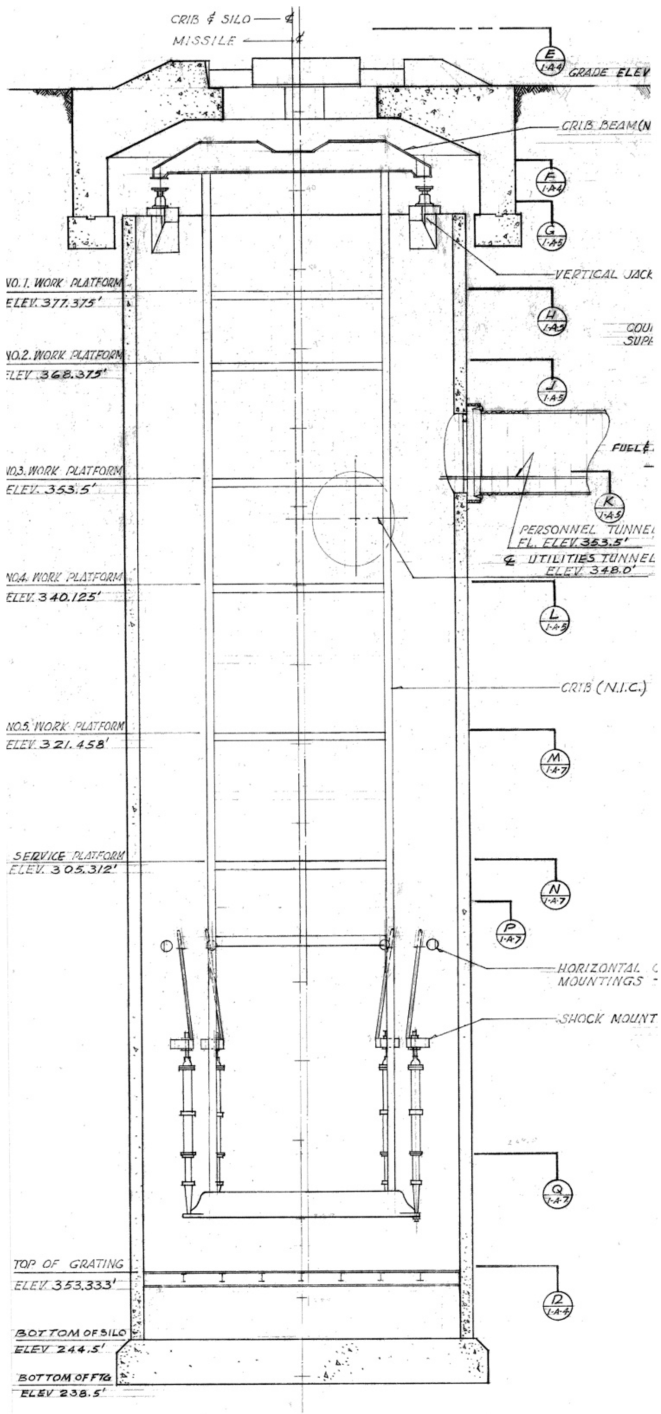


Figure 3.20

Section of "Hollywood Hard" Titan I ICBM silo, Operational Silo Test Facility, Vandenberg Air Force Base*,* California, 1959. Air Force Historical Research Division, Maxwell Air Force Base Archives, Alabama.

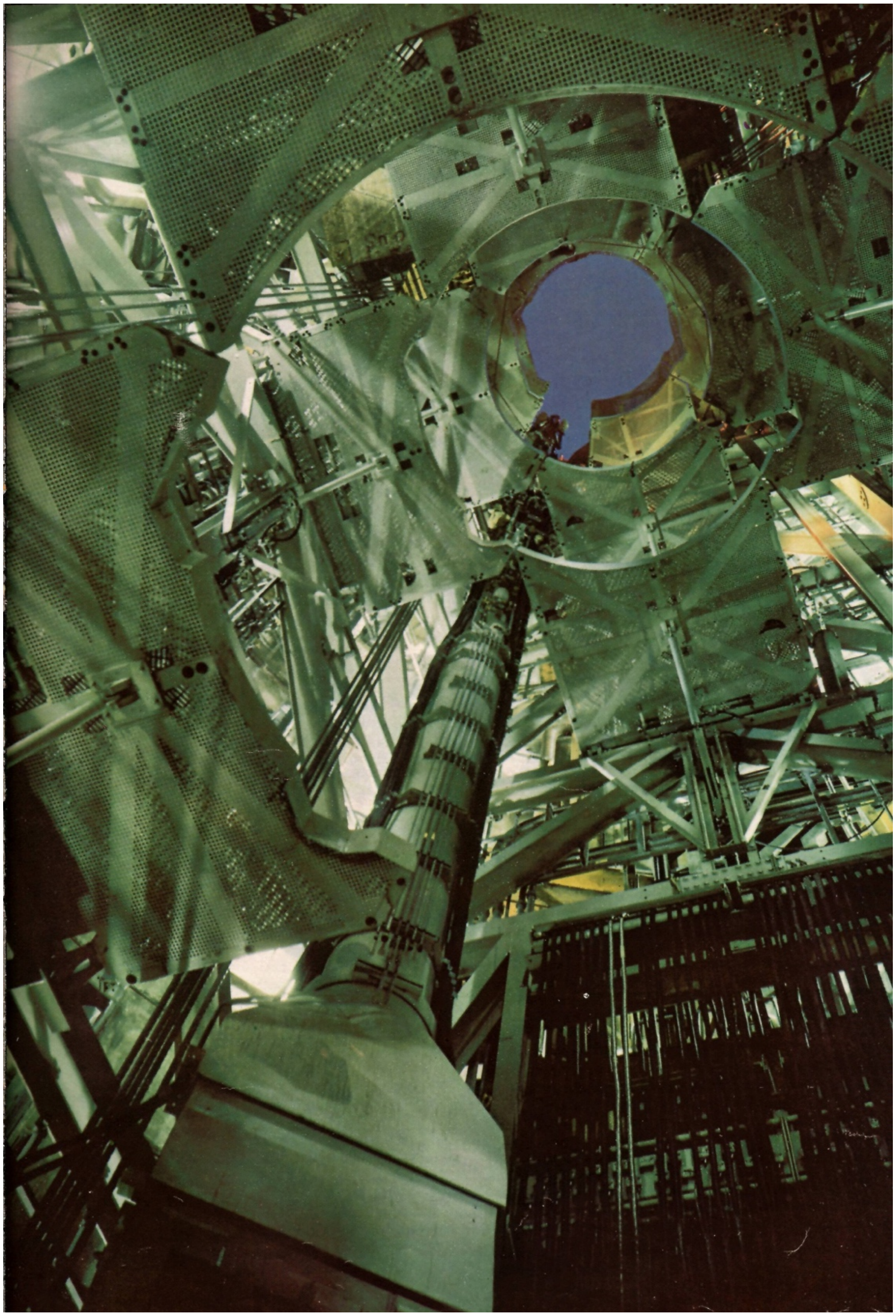


Figure 3.21

Upward view of a completed Titan I ICBM missile silo. Source: *Fortune* (August 1960).

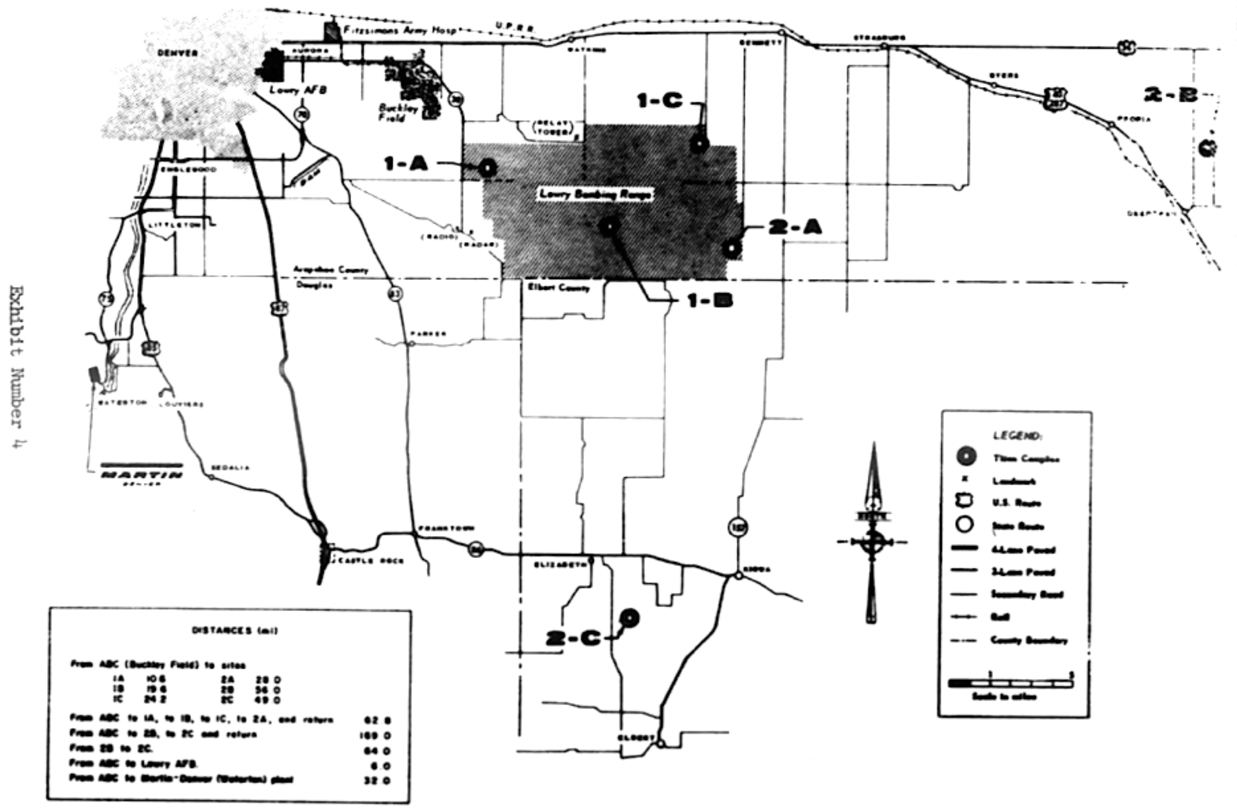


Fig. 1 Base T-1 Vicinity Map

Figure 3.22

Vicinity map of Lowry AFB, Colorado, including two fully hardened and fully operational Titan 3x3 squadrons (724th and 725th Strategic Missile Squadrons). From: Iola M. Sayers, *History of the Site Activation Task Force (Lowry),* 1960. US Air Force Historical Research Division, Maxwell Air Force Base Archives, Alabama, n.p.

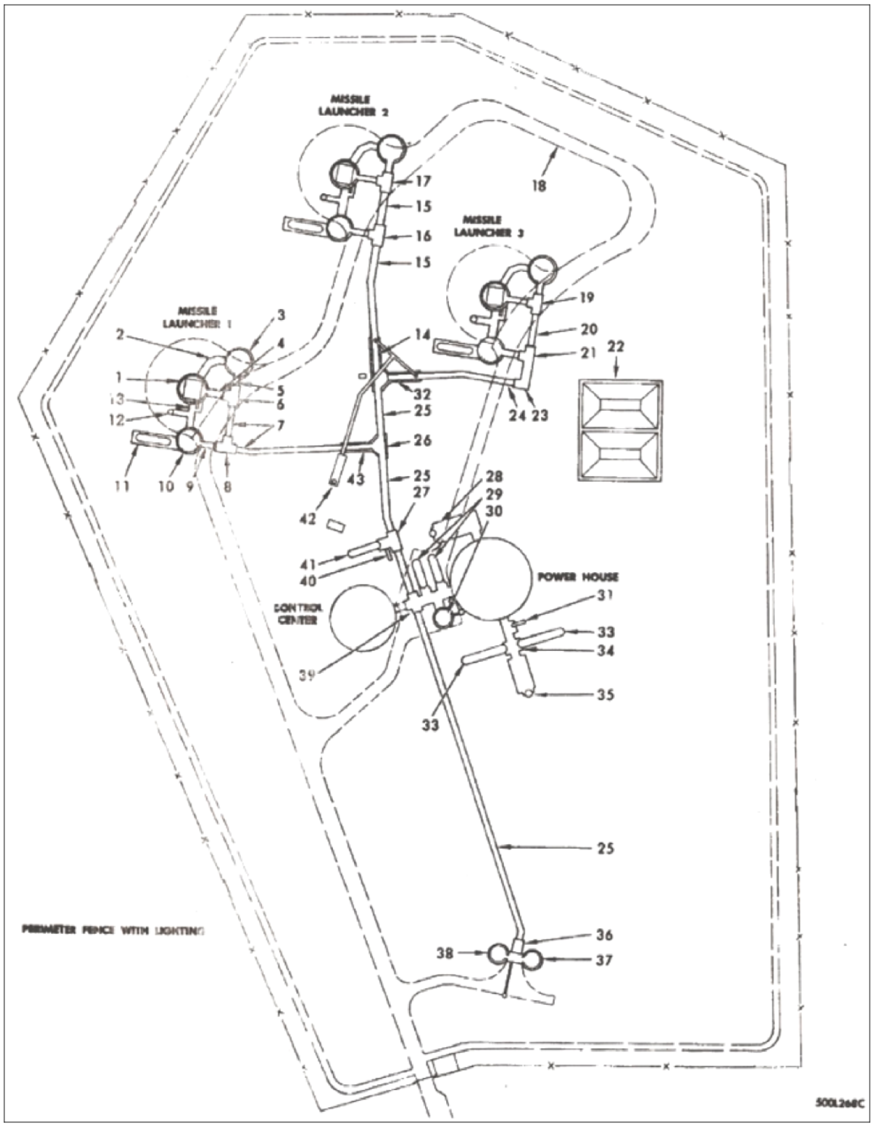


Figure 3.23

Site plan of a fully hardened Titan I ICBM complex at Lowry AFB, Colorado.
From: *Operation and Organizational Maintenance: USAF Model HGM-25A Missile Weapon System. Technical Manual, (Washington, D.C.,* U.S. Air Force, 1964).

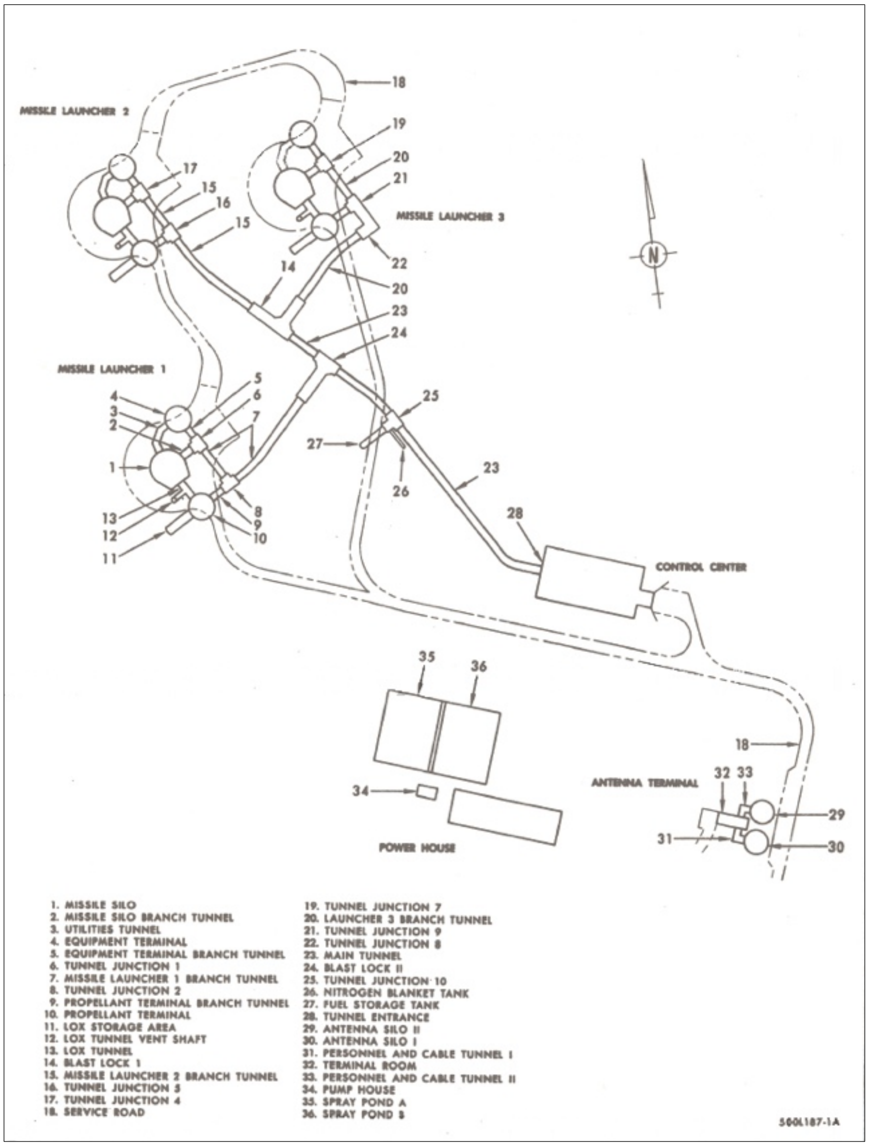


Figure 3.24

Site plan of fully operation, yet only "Hollywood Hard," Titan I ICBM complex, Vandenberg AFB Complex, California. From: *Operation and Organizational Maintenance: USAF Model HGM-25A Missile Weapon System*, Technical Manual, (Washington, D.C., U.S. Air Force, 1964).

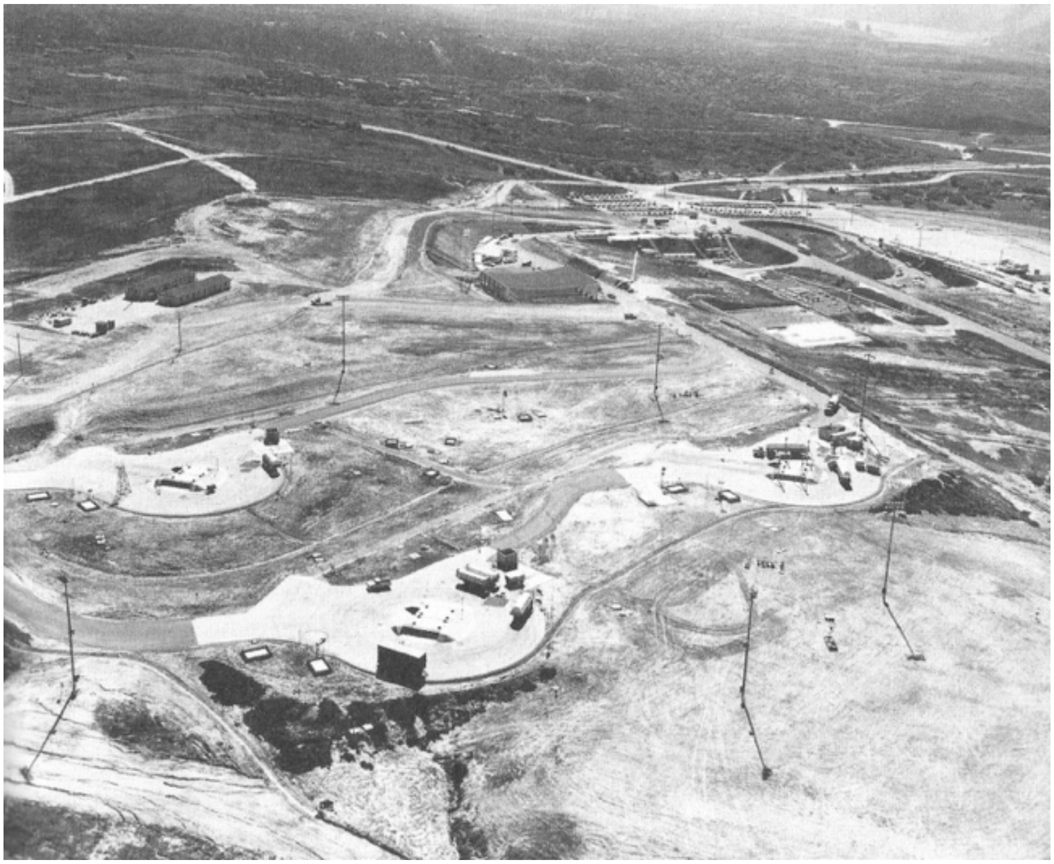


Figure 3.25

Aerial Photograph of the Titan I ICBM, Vandenberg AFB Training Facility. From: David K. Stumpf, *Titan II: A History of a Cold War Missile Program* (Fayetteville: University of Arkansas Press, 2000), p. 23.

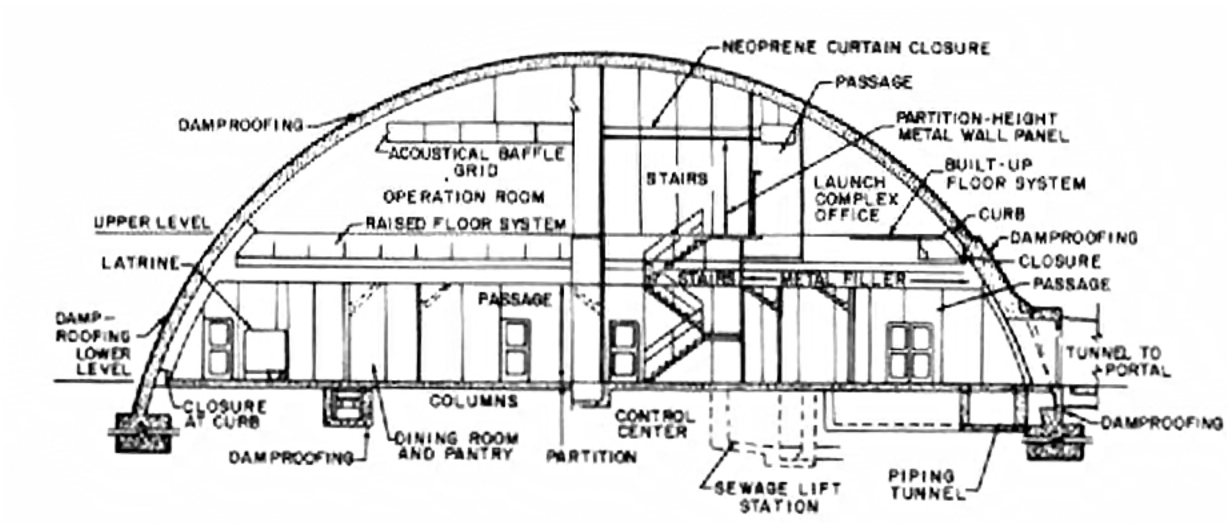


Figure 3.26

Section of Control Center, fully hardened, operational Titan I ICBM facility, Lowry AFB, 1962. Colorado. Courtesy Pete Flickytail.

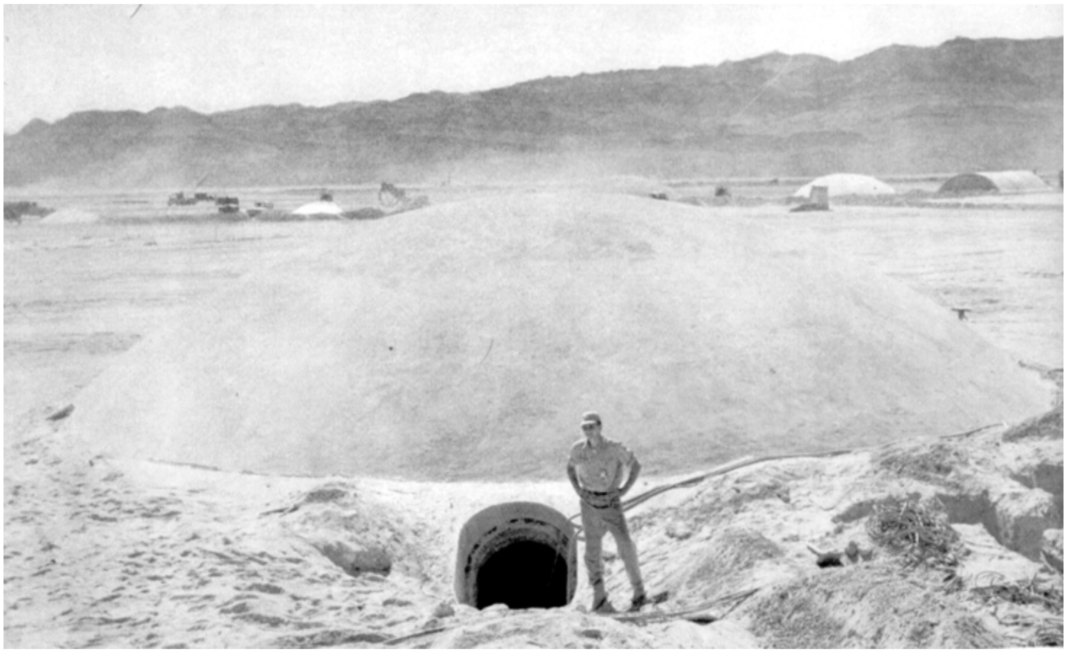
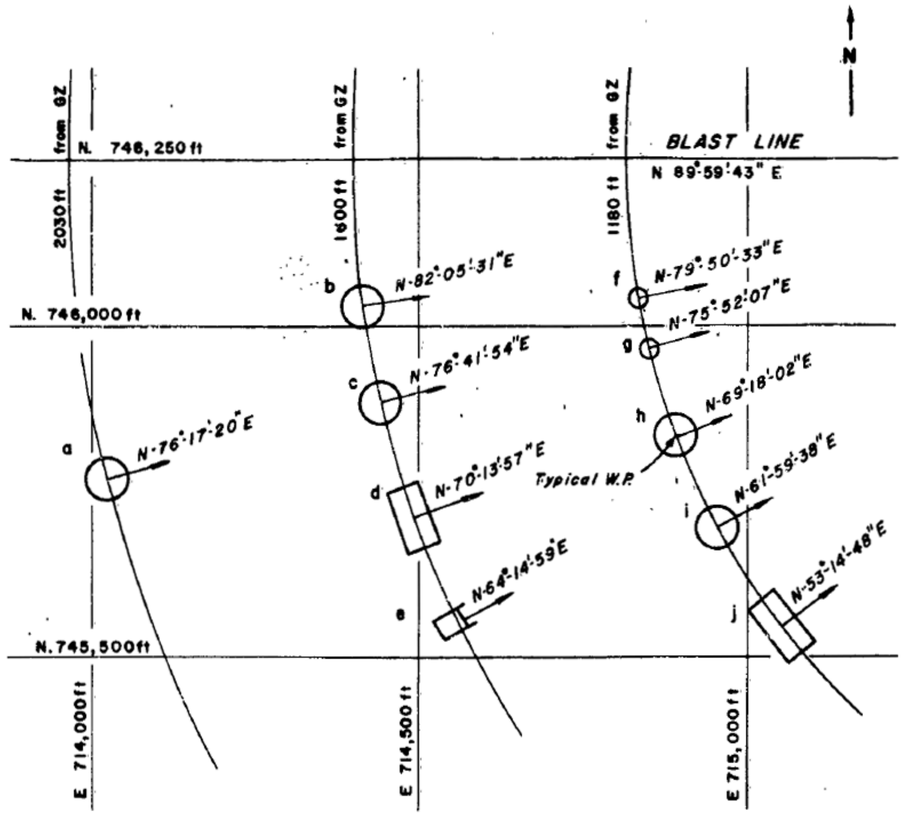


Figure 3.27

Fifty-foot in diameter domes tested at the Nevada Test Site, designed by American Machine Foundry, 1957. From: William Maxwell Rice, “Architecture and the Nuclear Age,” *Journal of the American Institute of Architects* (July 1958).



PLOT PLAN

Location of Structure at Work Point

Mark	Project	To Ground Zero	Location		To Blast Line	Structure
		feet	feet		feet	
a	30.1-8001.03	2,030	N-745,768.94	E-714,028.64	461	Concrete Dome
b	30.1-8001.02	1,600	N-746,029.90	E-714.416.90	220	Concrete Dome
c	3.6-9027.02	1,600	N-745,881.95	E-714,443.61	368	Concrete Dome
d	3.6-9028.02	1,600	N-745,706.02	E-714,494.96	541	Concrete Arch
e	30.1-8008.00	1,600	N-745,555.04	E-714,559.55	695	Prototype Door
f	3.6-9026.01	1,180	N-746,041.93	E-714,839.08	208	Aluminum Dome (½-inch)
g	3.6-9026.02	1,180	N-745,961.96	E-714,856.29	288	Aluminum Dome (1-inch)
h	3.6-9027.01	1,180	N-745,833.00	E-714,896.75	417	Concrete Dome
i	30.1-8001.01	1,180	N-745,696.03	E-714,958.74	554	Concrete Dome
j	3.6-9028.01	1,180	N-745,544.06	E-715,058.09	706	Concrete Arch

Figure 3.28

Test plan and arrangement of aluminum and concrete domes, 1957. Nevada Test Site. From: E. H. Bultmann, Jr, T. G. Morrison, and M. R. Johnson, *Operation Plumbbob: Full-Scale Field Tests of Dome and Arch Structures,* Air Force Special Weapons center and American Machine and Foundry Company, August 31, 1960.

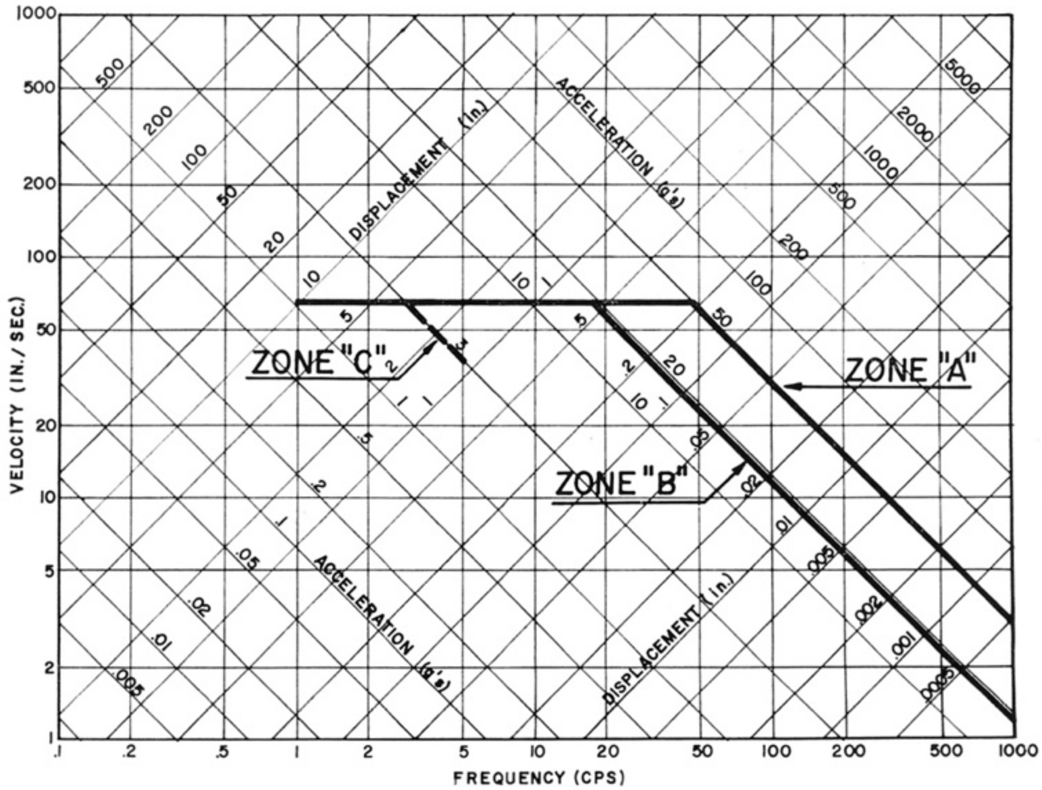


Fig. 9. Horizontal and vertical response spectra, showing plot of velocity, accelerations, and displacements for each zone within the facilities.

Figure 3.29

The Shock Zones for Titan I ICBM facilities, developed by DMJM determine equipment placement and degree of shock-absorption needed. From: *Aerospace Engineering* (June 1961).

Figure 3.30

Toilet mounted on shock absorbers, Lowry AFB Titan I fully hardened, operational complex. Photo courtesy Pete Flickytale.

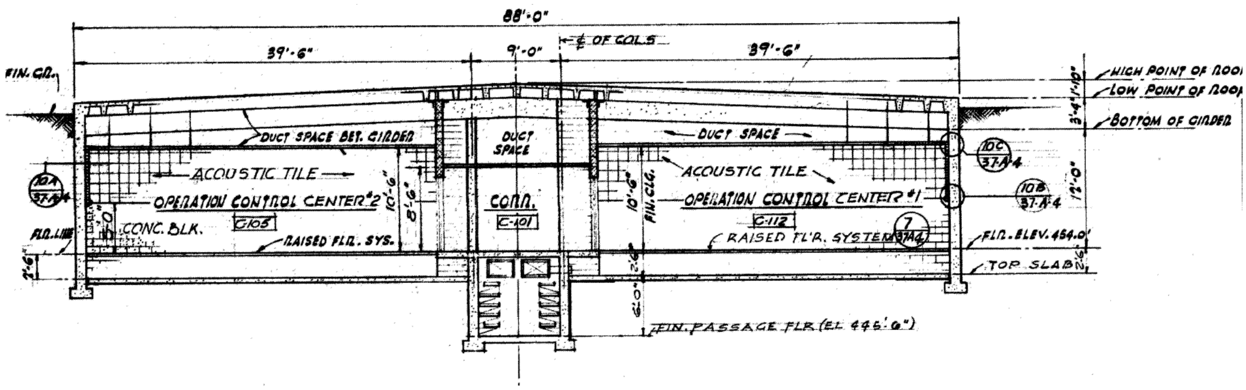


Figure 3.31

Section of “Hollywood Hard” Titan I ICBM Control Center, Training Base Facility, Vandenberg AFB. Air Force Historical Research Division, Maxwell Air Force Base Archives, Alabama.

Figure 4.0

Anthony Lumsden and Cesar Pelli, model of a proposed housing community, Sunset Mountain Park*,* 1966.

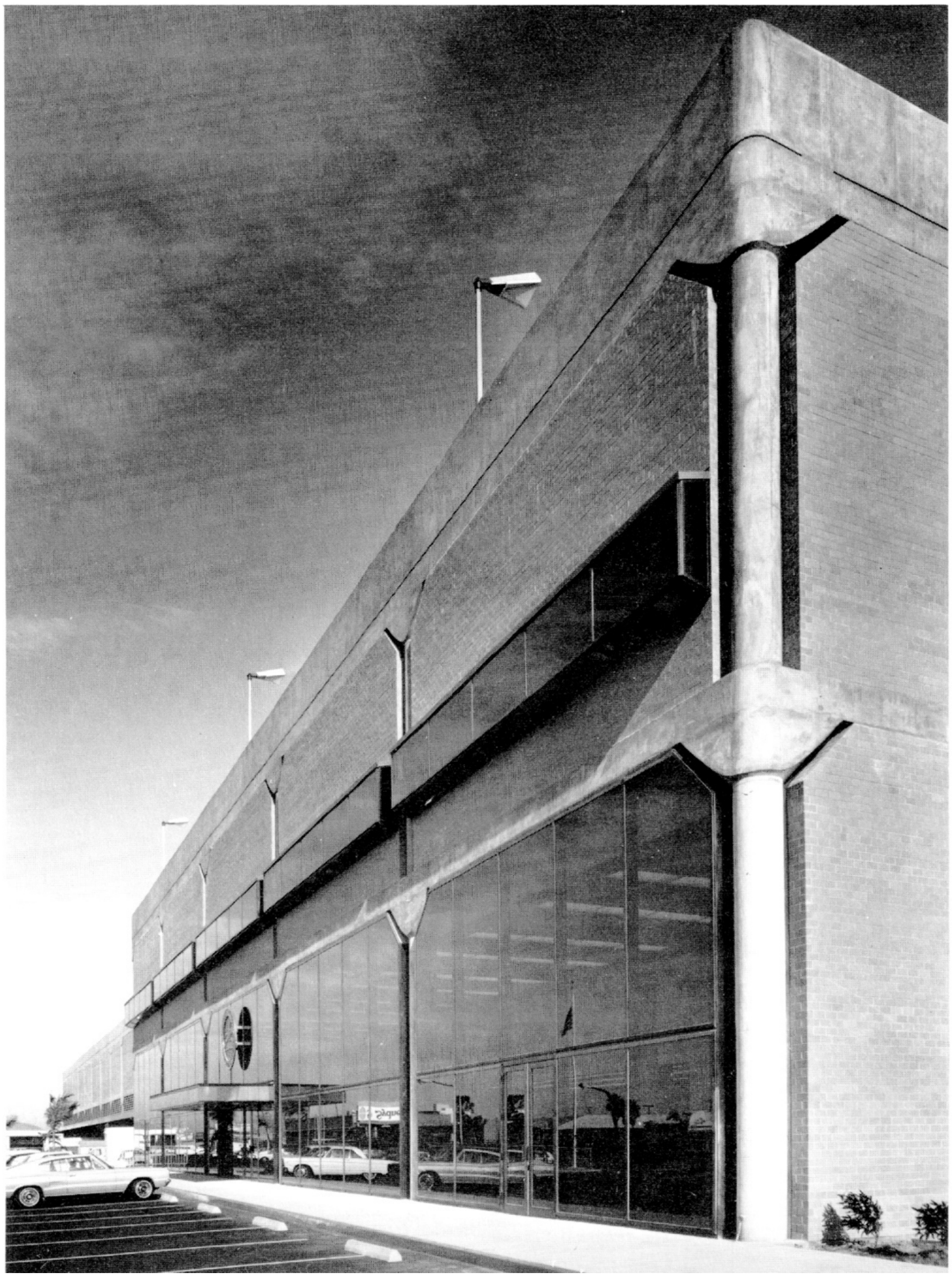


Figure 4.1

Worldway Postal Center, 1971. From: John Pastier, *Cesar Pelli, Monographs in Contemporary Architecture* (New York: Whitney Library of Design, 1980), p. 41.

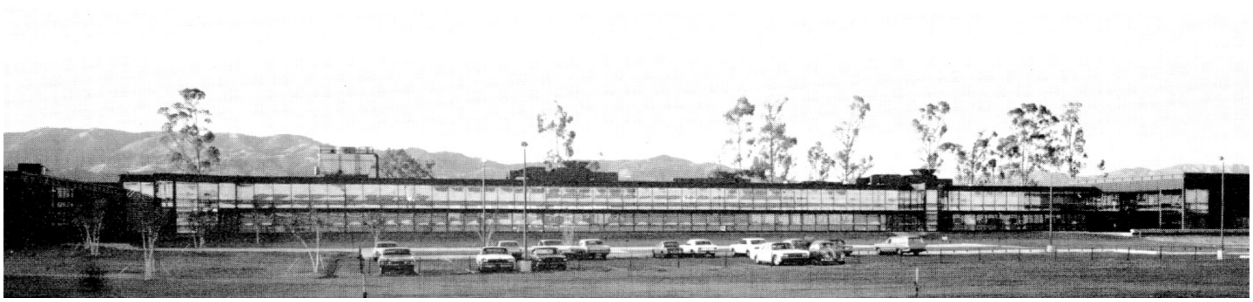


Figure 4.2

Elevation of Teledyne Laboratories, Northridge, CA, 1968. From: John Pastier, *Cesar Pelli, Monographs in Contemporary Architecture* (New York: Whitney Library of Design, 1980), p. 28.

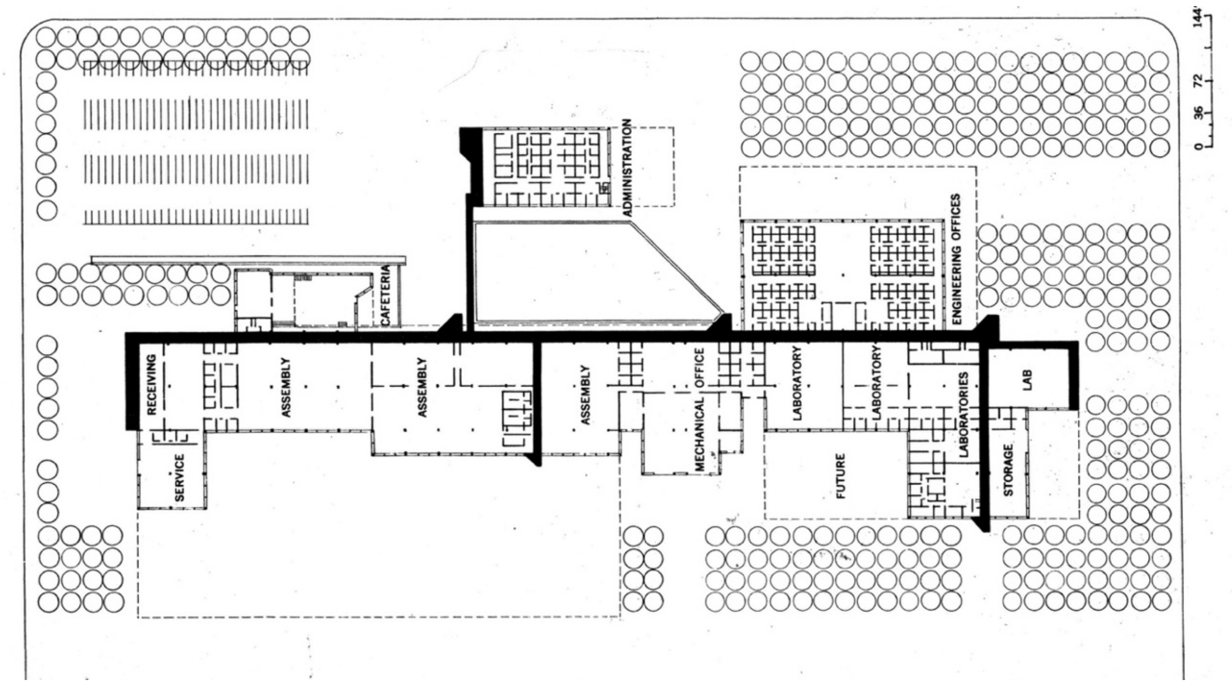


Figure 4.3

Site Plan of Teledyne Laboratories, Northridge, CA, 1968. From: Esther McCoy, "Planned for Change," *Architectural Forum,* (July/August 1968), p. 105.

Figure 4.4

Interior of the “spine” of Teledyne Laboratories, Northridge, CA, 1968. Photo by: Julius Shulman. J. Paul Getty Trust. Getty Research Institute, Los Angeles.

Figure 4.5

Teledyne Laboratories, Northridge, CA, 1968. Photo by: Julius Shulman. J. Paul Getty Trust. Getty Research Institute, Los Angeles.

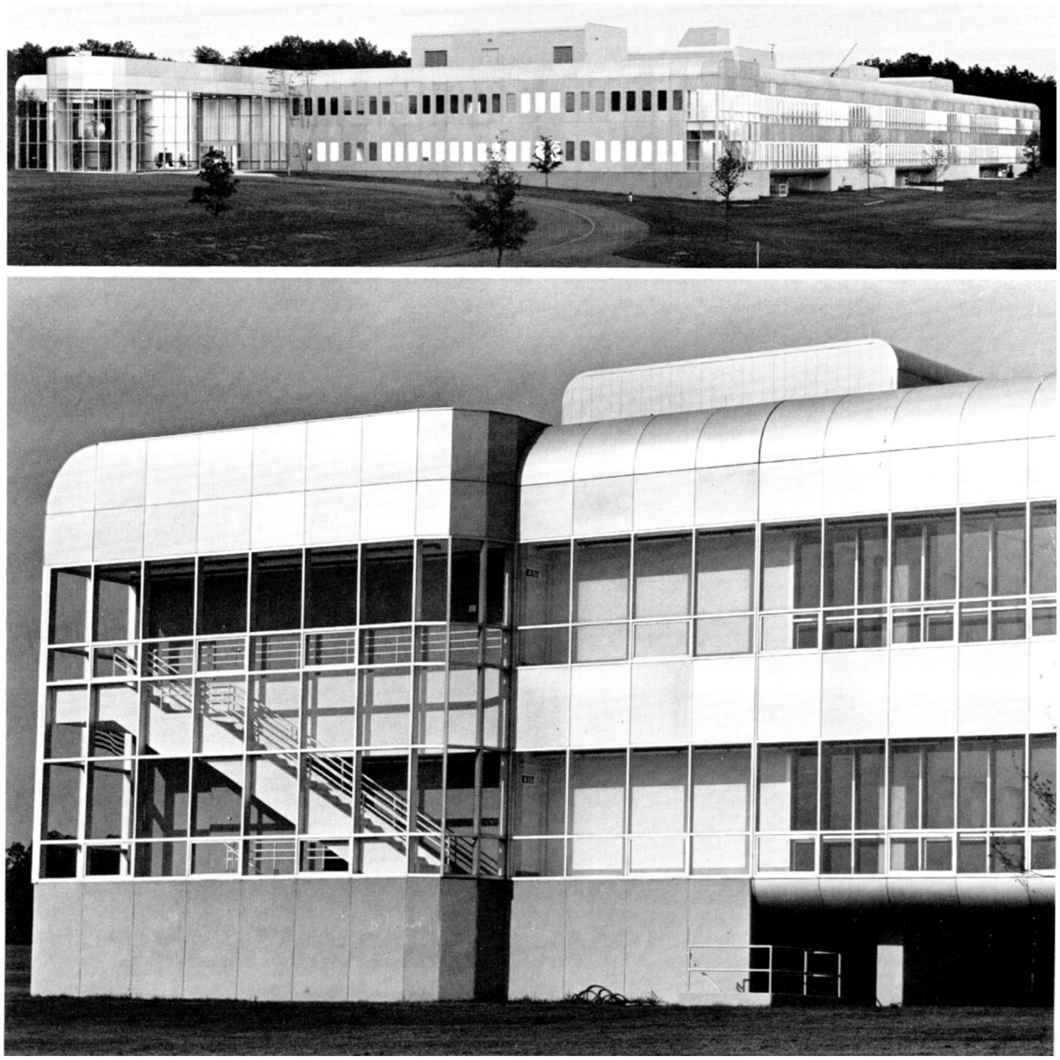


Figure 4.6

View of COMSAT Laboratories from the freeway (top) and detail view of secondary corridor, Clarksburg, MD, 1969. From: John Pastier, *Cesar Pelli*, Monographs in Contemporary Architecture (New York: Whitney Library of Design, 1980), p. 45.

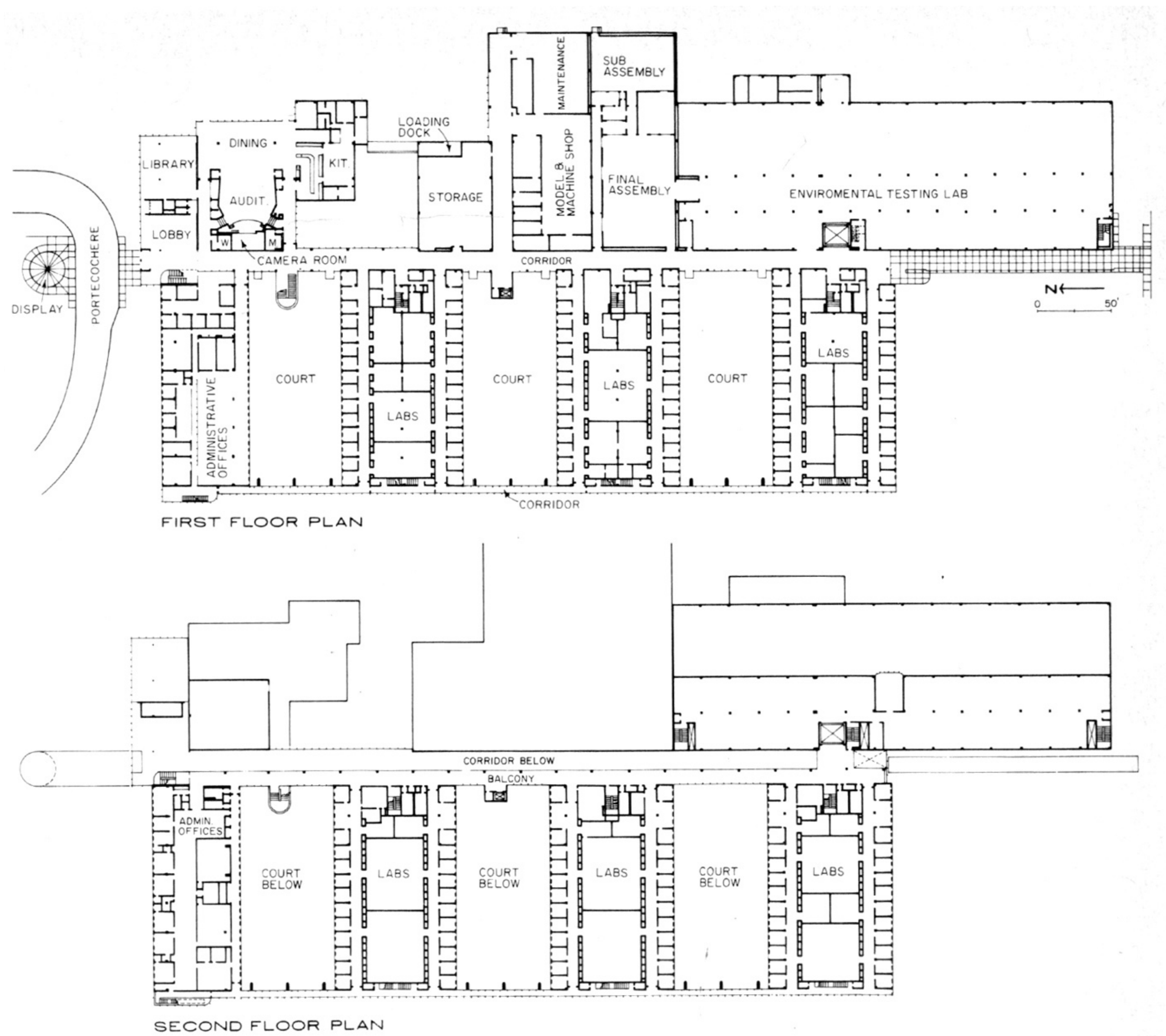
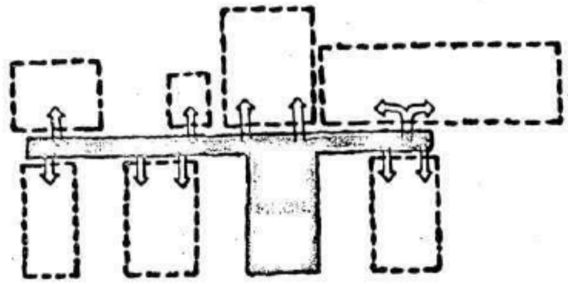


Figure 4.7

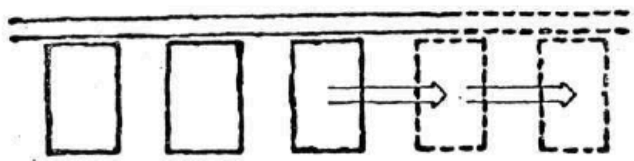
First and Second Floor Plan of COMSAT, Clarksburg, MD, 1969. From: *Progressive Architecture* (August 1970), p. 71.

Mechanical services follow the same pattern and are therefore flexible, capable of growth and easy to service.



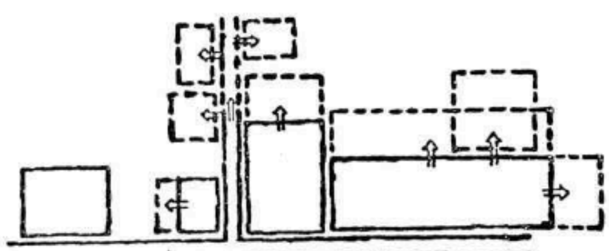
Service distribution

Some functions will expand in a predetermined order. Its needs are clear; growth can be anticipated.



Predetermined growth

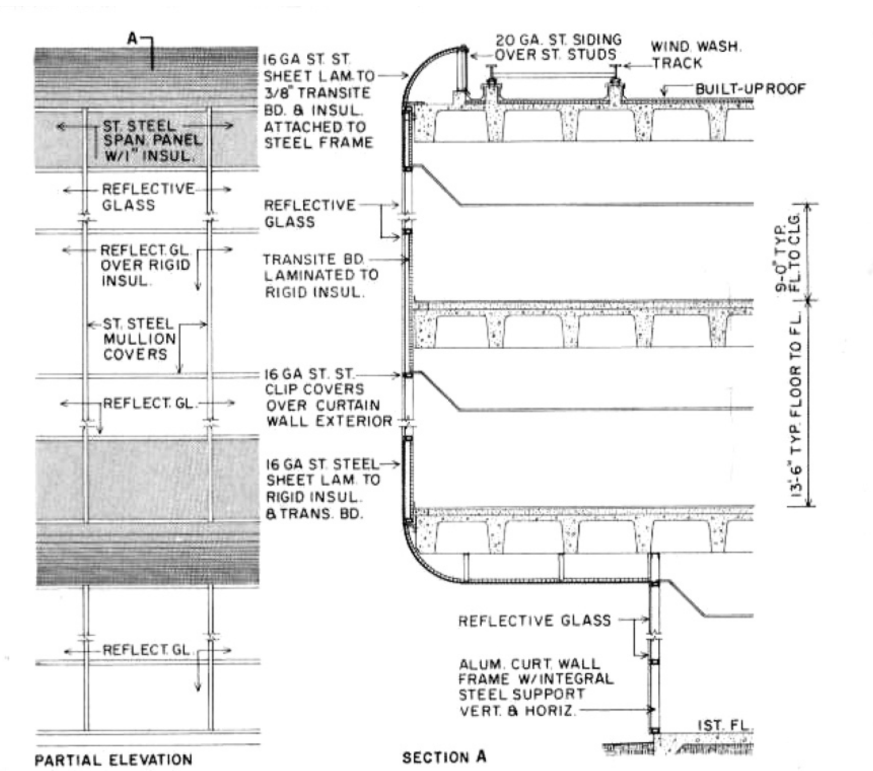
Some functions will need expansion but the specific future needs cannot be foreseen. The plan is purposely not composed and it is therefore unfinished, open ended.



Undetermined growth

Figure 4.8

Diagrammatic plans of COMSAT Laboratories, Clarksburg, MD, 1967. Cesar Pelli Collection, Yale University Archives.



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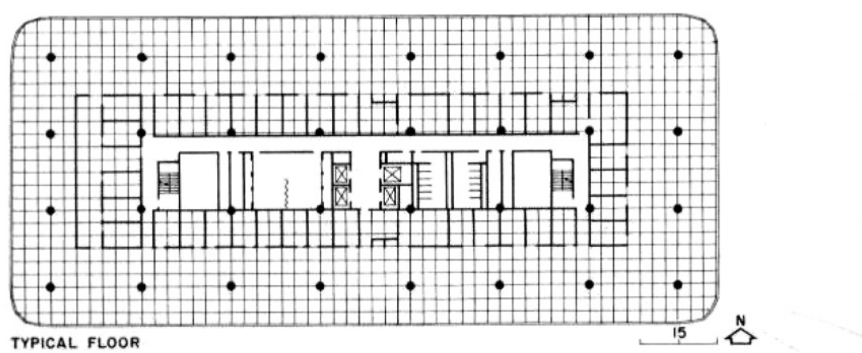

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Figure 4.9

Section detail of glass and aluminum, as well as a typical floor plan. Federal Aviation Administration Building, Hawthorne, CA, 1973. From: *Architectural Record* (May 1975), p. 117.

Figure 4.10

Federal Aviation Administration Building, Hawthorne, CA, 1973. Photo by Thom Wayne. From: *Progressive Architecture* (1976).

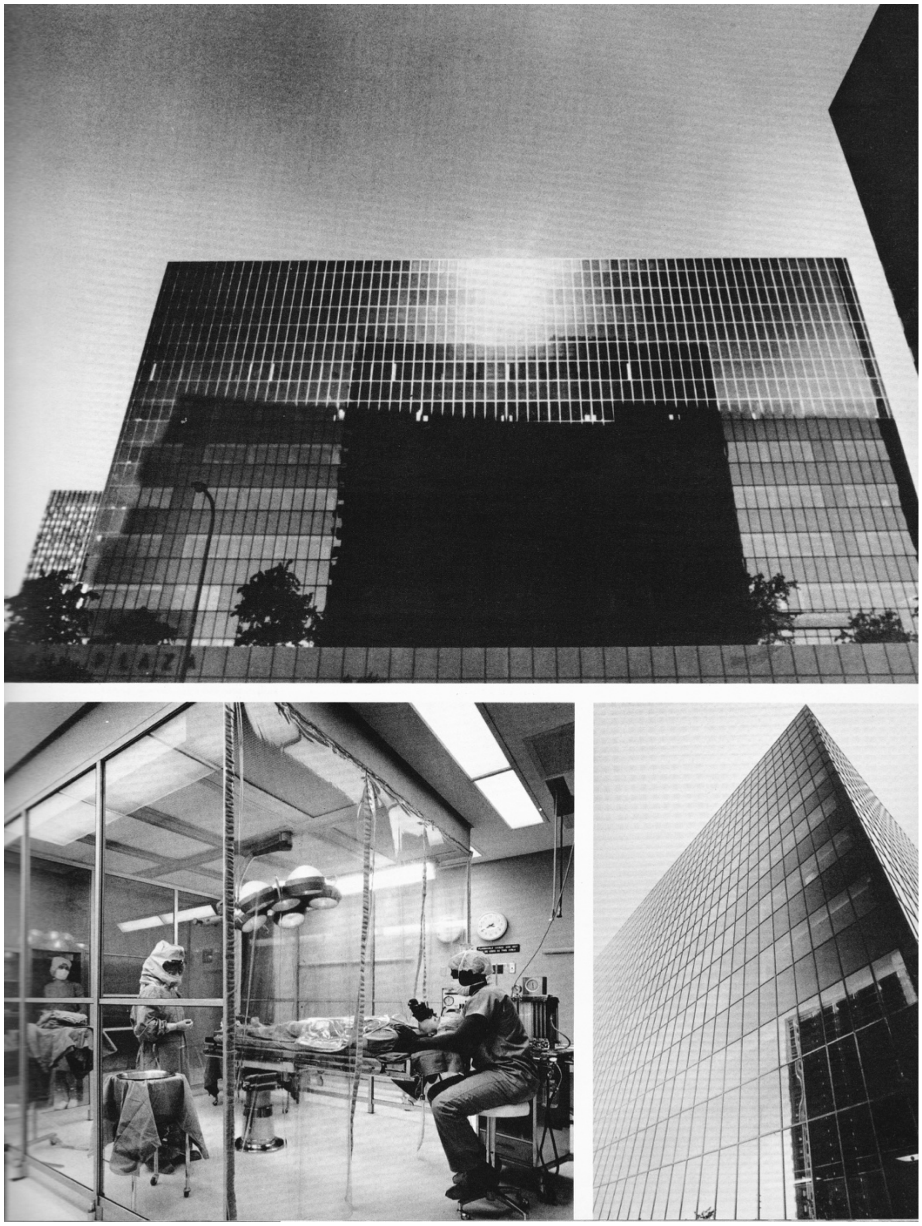

Figure 4.11

Century City Medical Plaza, Los Angeles, CA, 1969. From: *DMJM Review* (1973).

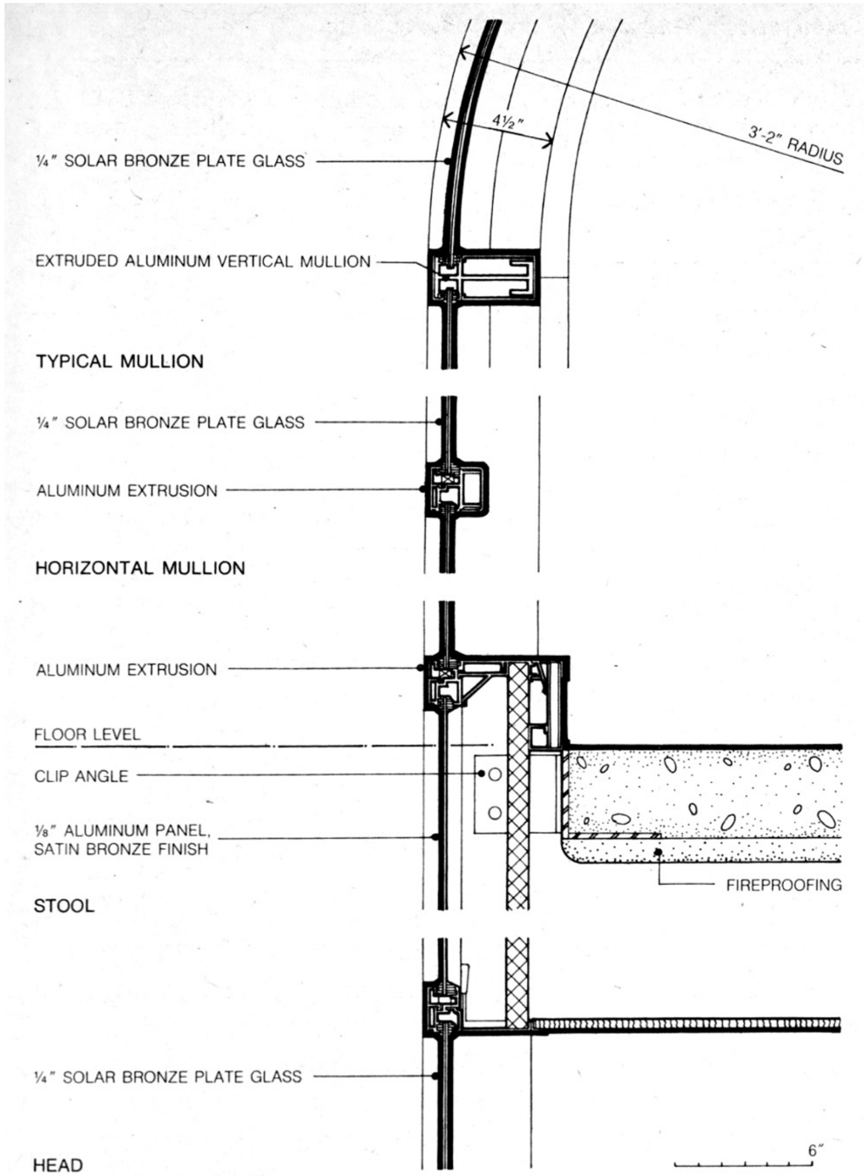

Figure 4.12

Section detail of One Park Plaza, including inverted mullion system. From: *Progressive Architecture* (1976).

Figure 4.13

Century Bank Plaza, Los Angeles, CA, 1972. Photo by Dale Lang. From: *Architectural Record* (May 1975).

Figure 4.14

Manufacturers Trust Building, Los Angeles, CA, 1974. Photo by Dale Lang. From: *Architectural Record* (May 1975).

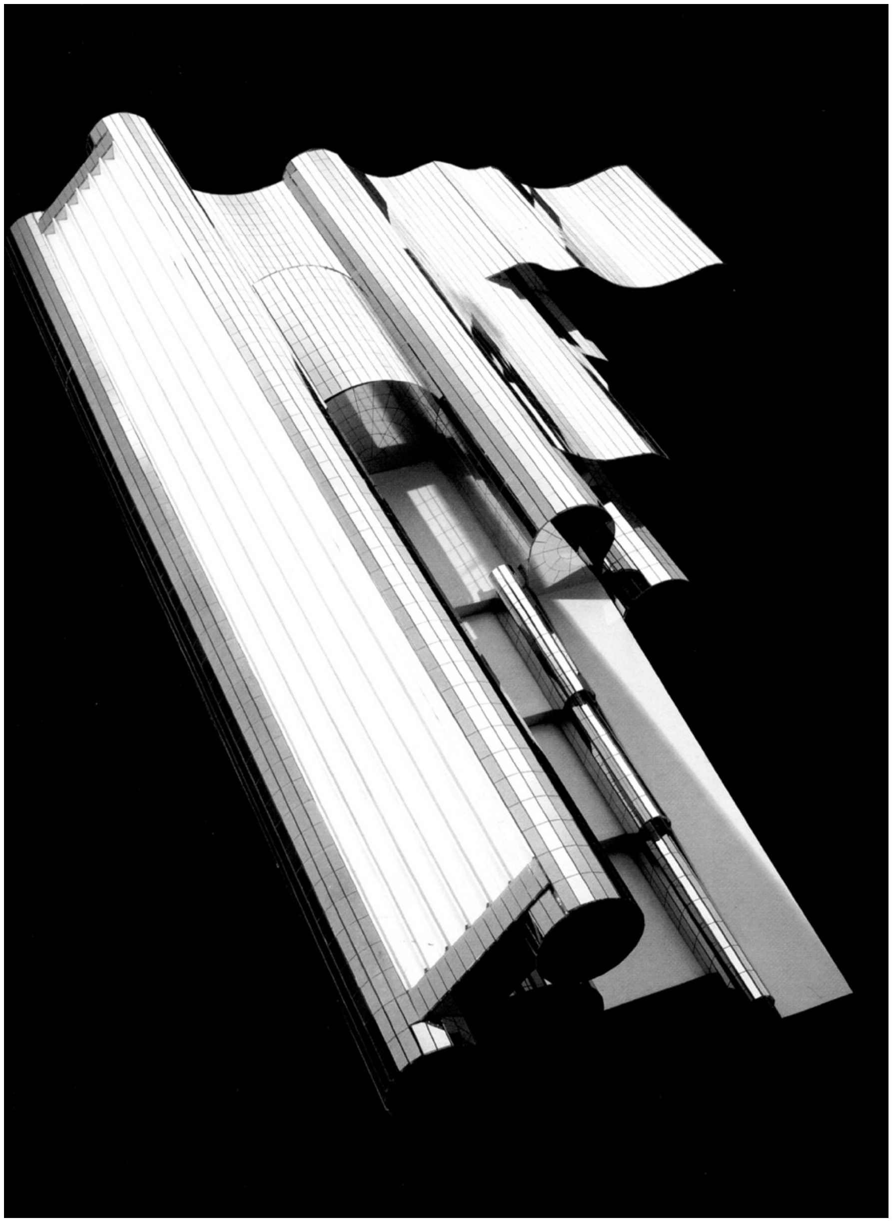

Figure 4.15

Model of Lugano Hotel and Convention Center, Lugano Switzerland, 1972. From: Stephen Dobney and Anthony J. Lumsden, eds., *A. J. Lumsden: Selected and Current Works*, Master Architect Series (Mulgrave: Images Publ. Group, 1997).

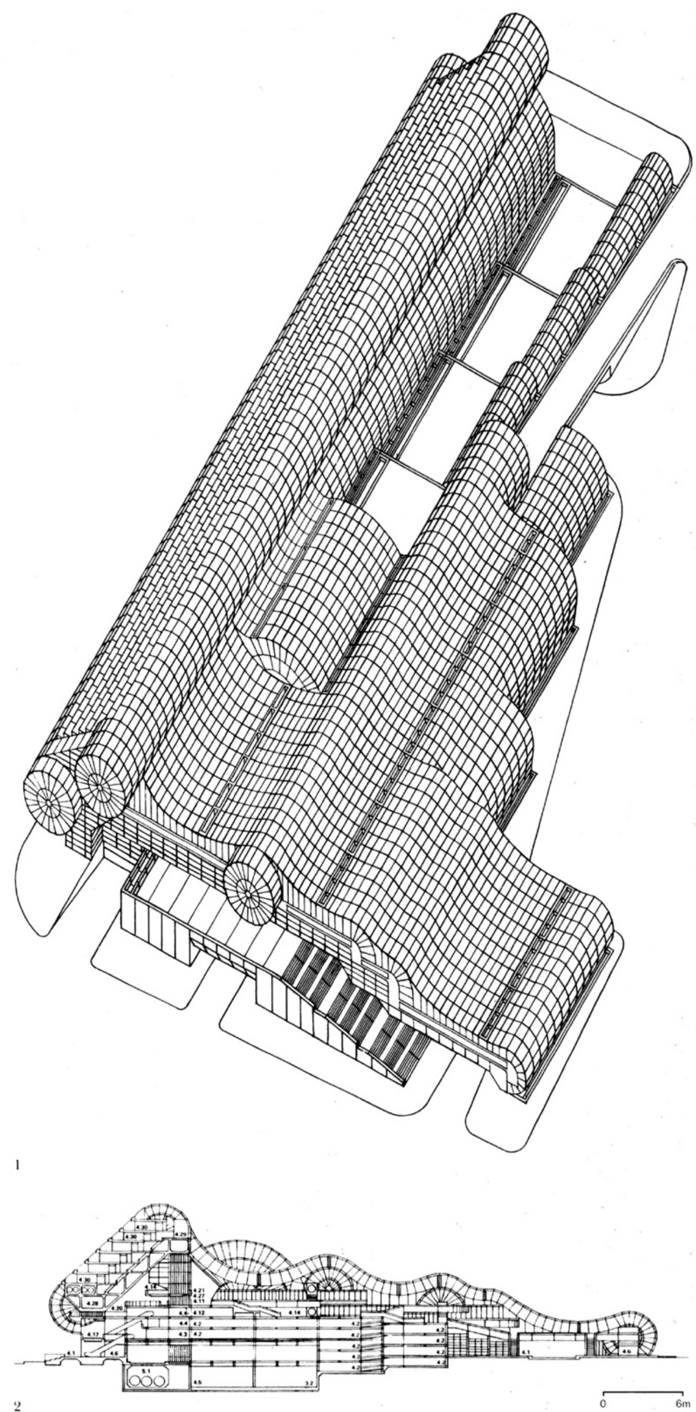

Figure 4.16

Axonometric and section of Lugano Convention Center, Lugano Switzerland, 1972. Source: Stephen Dobney and Anthony J. Lumsden, eds., *A. J. Lumsden: Selected and Current Works*, Master Architect Series (Mulgrave: Images Publ. Group, 1997), p. 20.

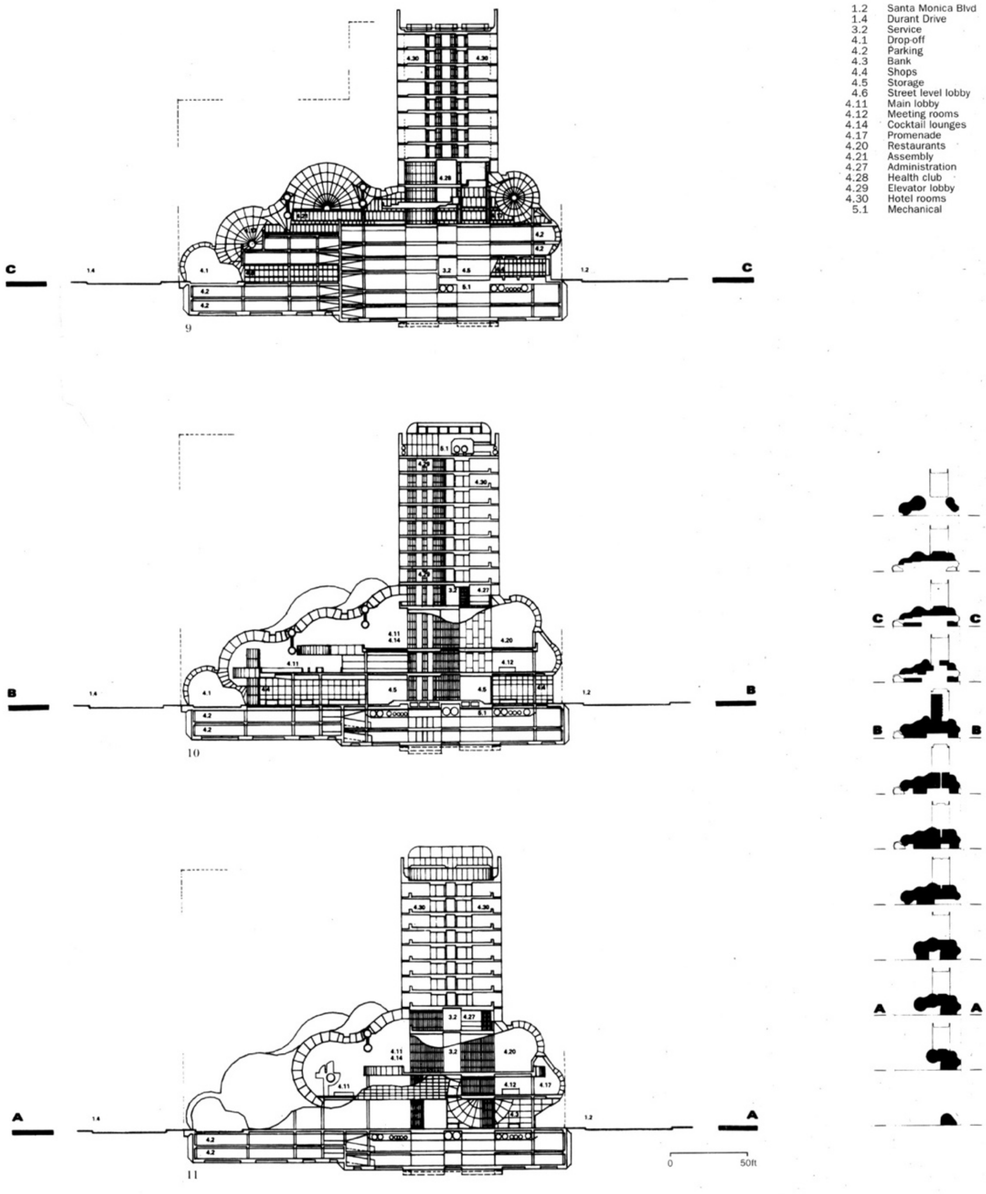

Figure 4.17

Section drawings of proposed Beverly Hills Hotel, 1973. Stephen Dobney and Anthony J. Lumsden, eds., *A. J. Lumsden: Selected and Current Works*, Master Architect Series (Mulgrave: Images Publ. Group, 1997), p. 160.

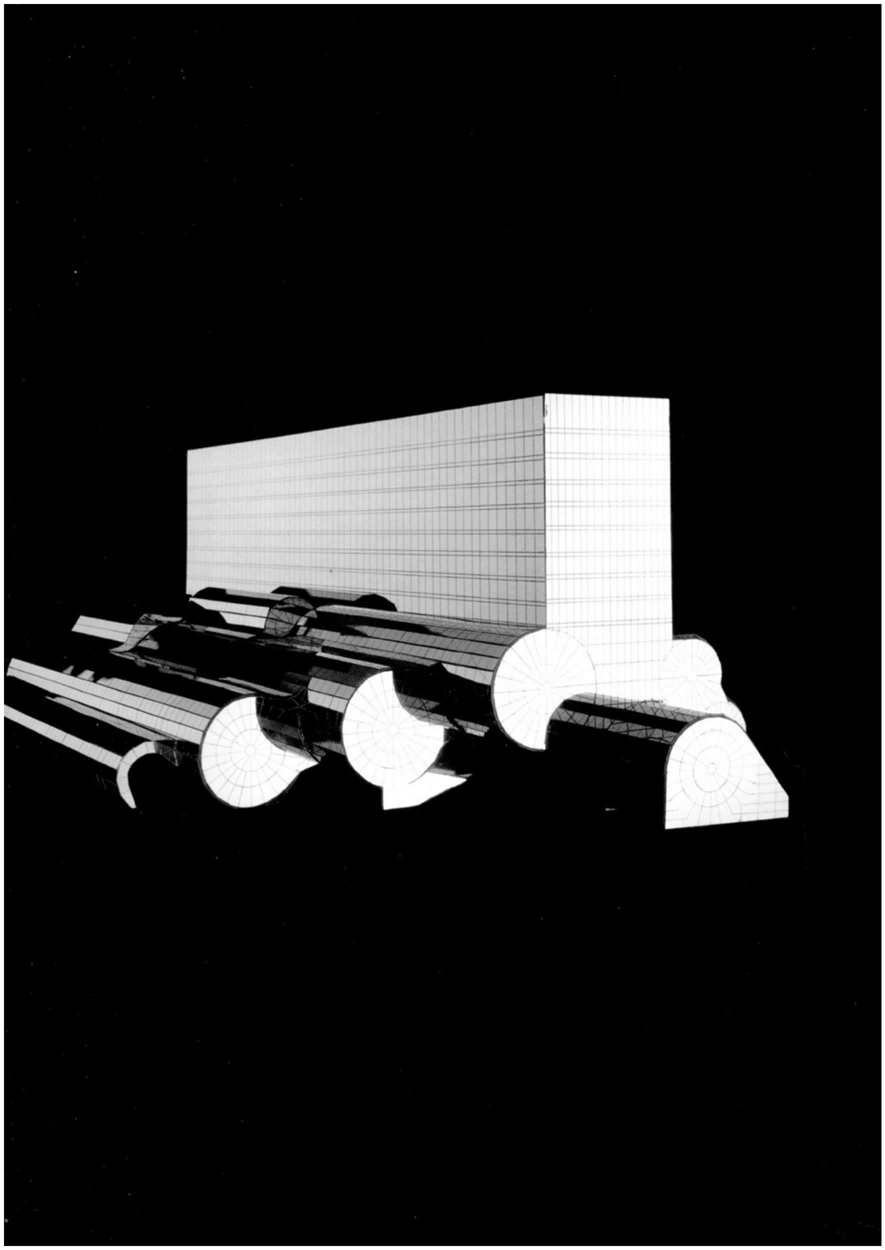

Figure 4.18

Model of proposed Beverly Hills Hotel, 1973. Stephen Dobney and Anthony J. Lumsden, eds., *A. J. Lumsden: Selected and Current Works*, Master Architect Series (Mulgrave: Images Publ. Group, 1997), p. 165.

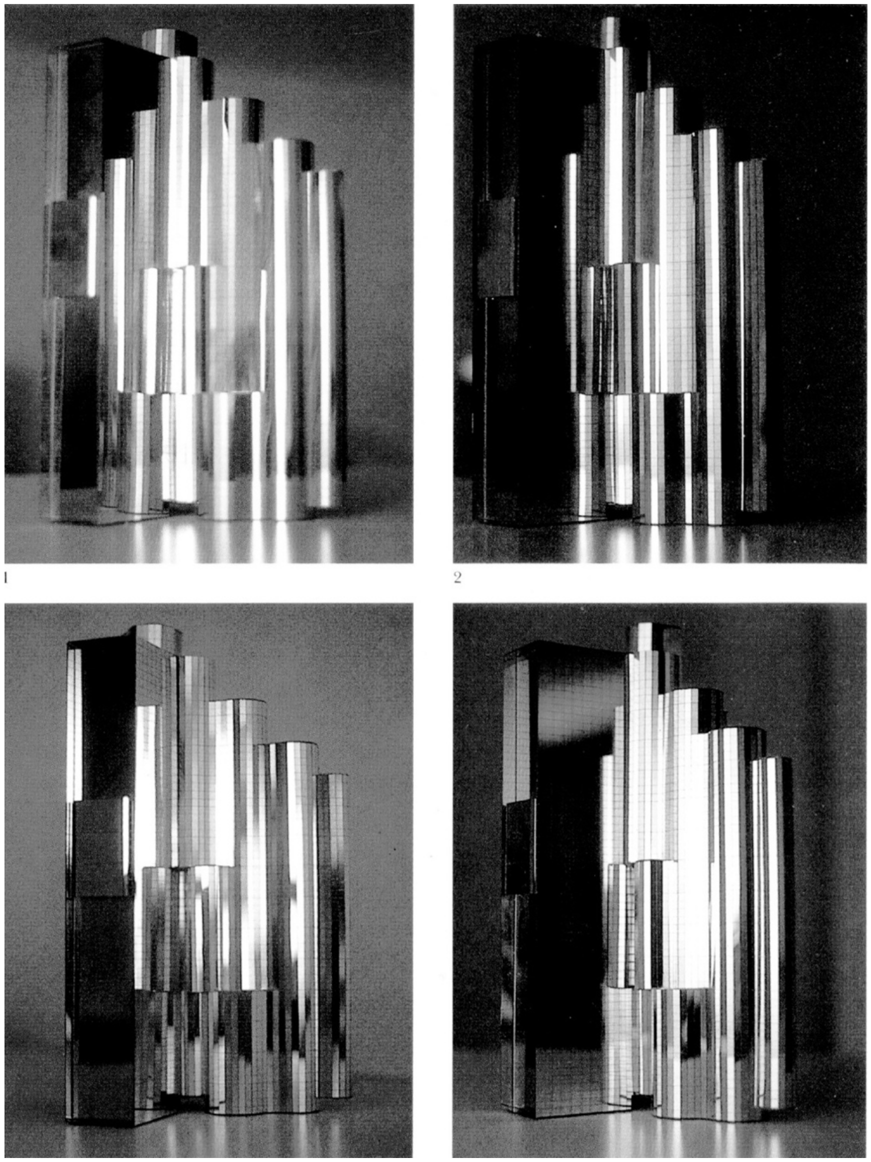

Figure 4.19

Models studies of proposed vertical Beverly Hill Hotel, 1973. From: Stephen Dobney and Anthony J. Lumsden, eds., *A. J. Lumsden: Selected and Current Works*, Master Architect Series (Mulgrave: Images Publ. Group, 1997), p. 162.

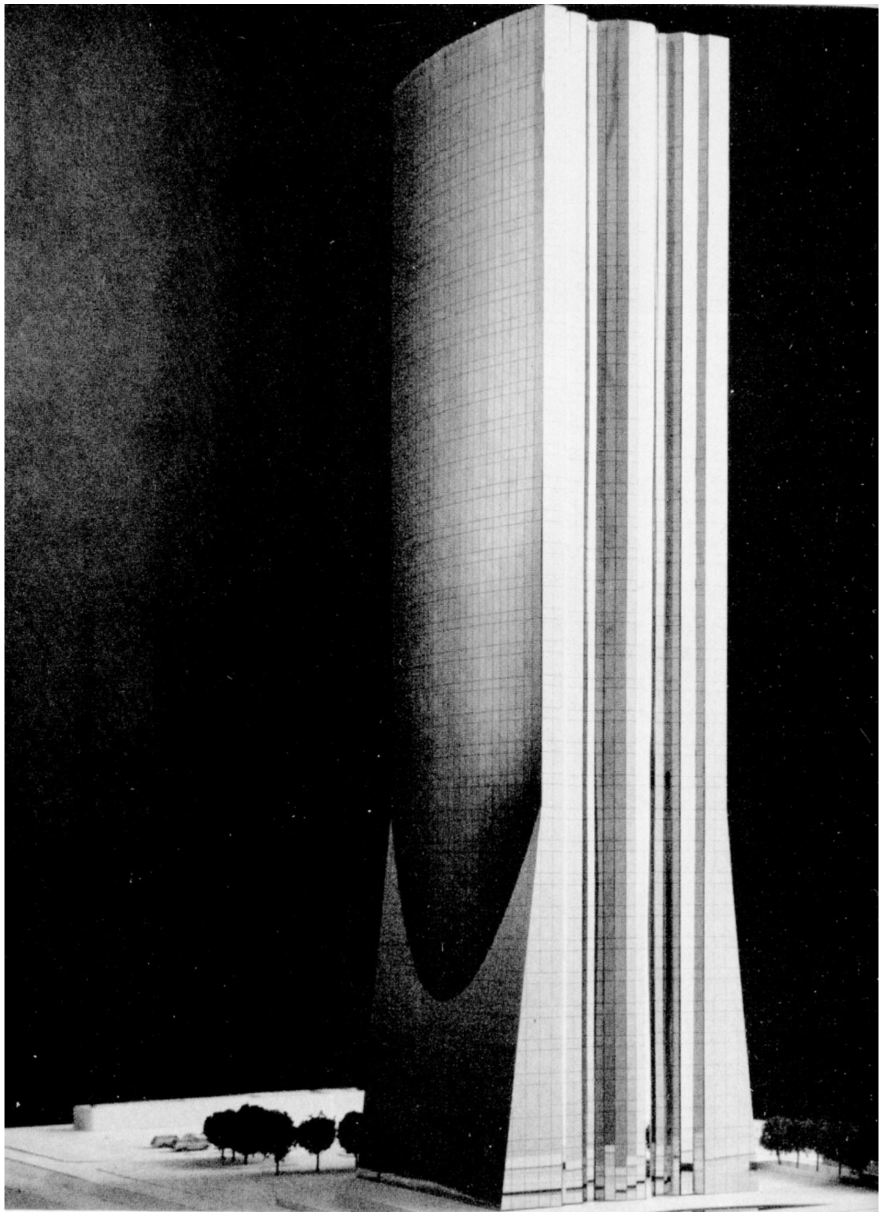

Figure 4.20

Model of proposed headquarters for proposed Bumi Daya Bank, Jakarta, Indonesia, 1975. From: *Architectural Record* (May 1975), p. 116.

BELOW: A stone wall along a slate walk leads to the screen-porch end of the gallery on the east side of the house. "The façade expresses the idea that the gallery is like an extruded form cut off at the ends," says Pelli. To the left of the entrance is the glass-and-wood dining pavilion, and at right is the stucco guest bedroom pavilion.

ABOVE RIGHT: Pelli designed diamond-patterned brickwork for the Ley Student Center expansion at Rice University in Houston, Texas, 1986. RIGHT: Pelli's Herring Hall is also at Rice University. "It is a modern building," says Pelli, "but it is very sympathetic to the beautiful older buildings designed by Cram, Goodhue and Ferguson in 1910."

ABOVE: The architect's aerial drawing. "All the shapes are, in a way, archetypal. The gallery is a stoa, the rooms are primary forms—cubes, prisms, pyramids—joined together in a dynamic conglomerate," Pelli explains.

will accept only one single-family residence a year, and it does not have to be of a certain size, but it has to be architecturally challenging. We have charged by the hour with some flat fees; both are usually derived from percentages of construction.

INTERIORS
We try to do much of the interior design for our projects ourselves under my close direction.

BACKGROUND
Cesar Pelli studied architecture at the University of Tucumán in Argentina and came to the United States to get his master of science degree in architecture at the University of Illinois. He worked for Eero Saarinen in Michigan and Connecticut, and in Los Angeles he worked for Daniel Mann Johnson & Mendenhall (DMJM) and Gruen Associates. Pelli began his own Connecticut-based firm when he went to Yale as the dean of the School of Architecture in 1977. A few of his large-scale projects include Manhattan's World Financial Center, the Pacific Design Center in Los Angeles and the United States Embassy in Tokyo. In 1989 Cesar Pelli & Associates received the American Institute of Architects Firm Award.

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Figure 4.21

Cesar Pelli describes his design for the Ley Student Center expansion at Rice University in Housing, Texas, in 1986, using the term "conglomerate" to describe the adjoining geometric volumes. From: *Architectural Digest: The AD 100 Architects*, August 15, 1991, p. 179.

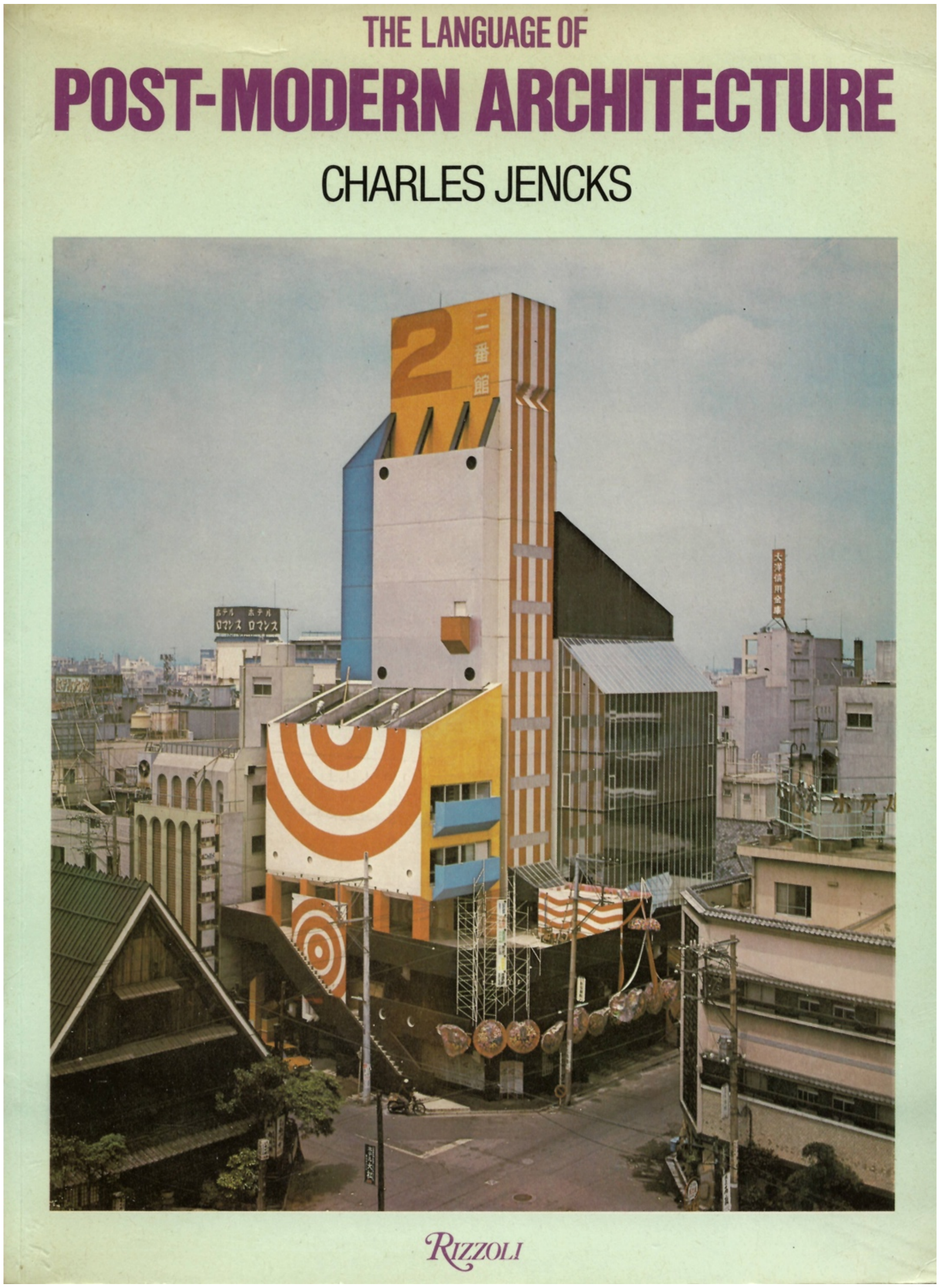

Figure 4.22

Ni-Ban-Kahn, Tokyo, Japan, 1970, featured on the cover of Charles Jencks, *The Language of Postmodernism* (1977).

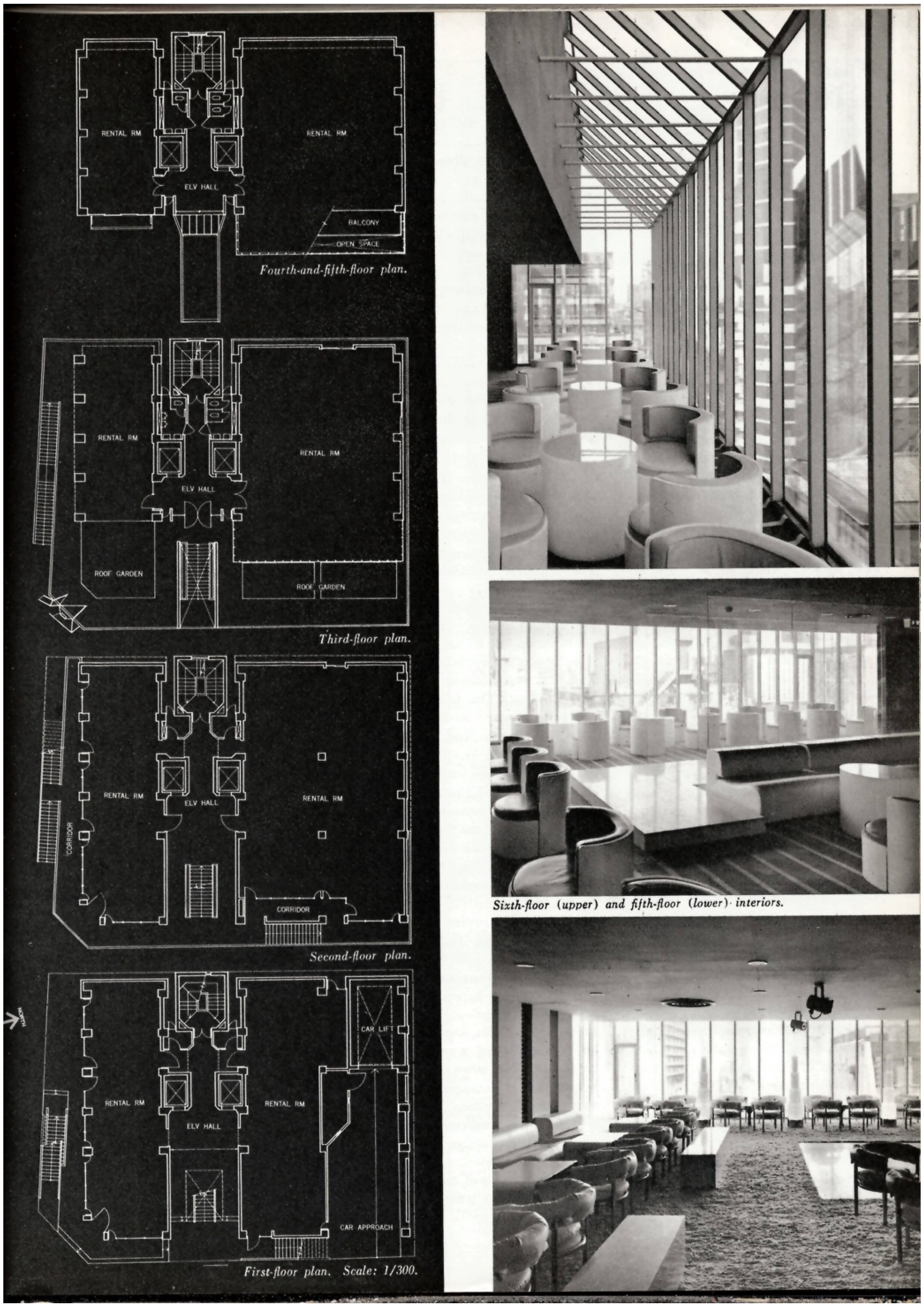

Figure 4.23

The Floor plans of the Ni-Ban-Kahn, Tokyo, Japan. From: Minoru Takeyama, "Omni-Rental-Stores: Ni-Ban-Kahn," The Japan Architect 45, (August 1970), p. 65.

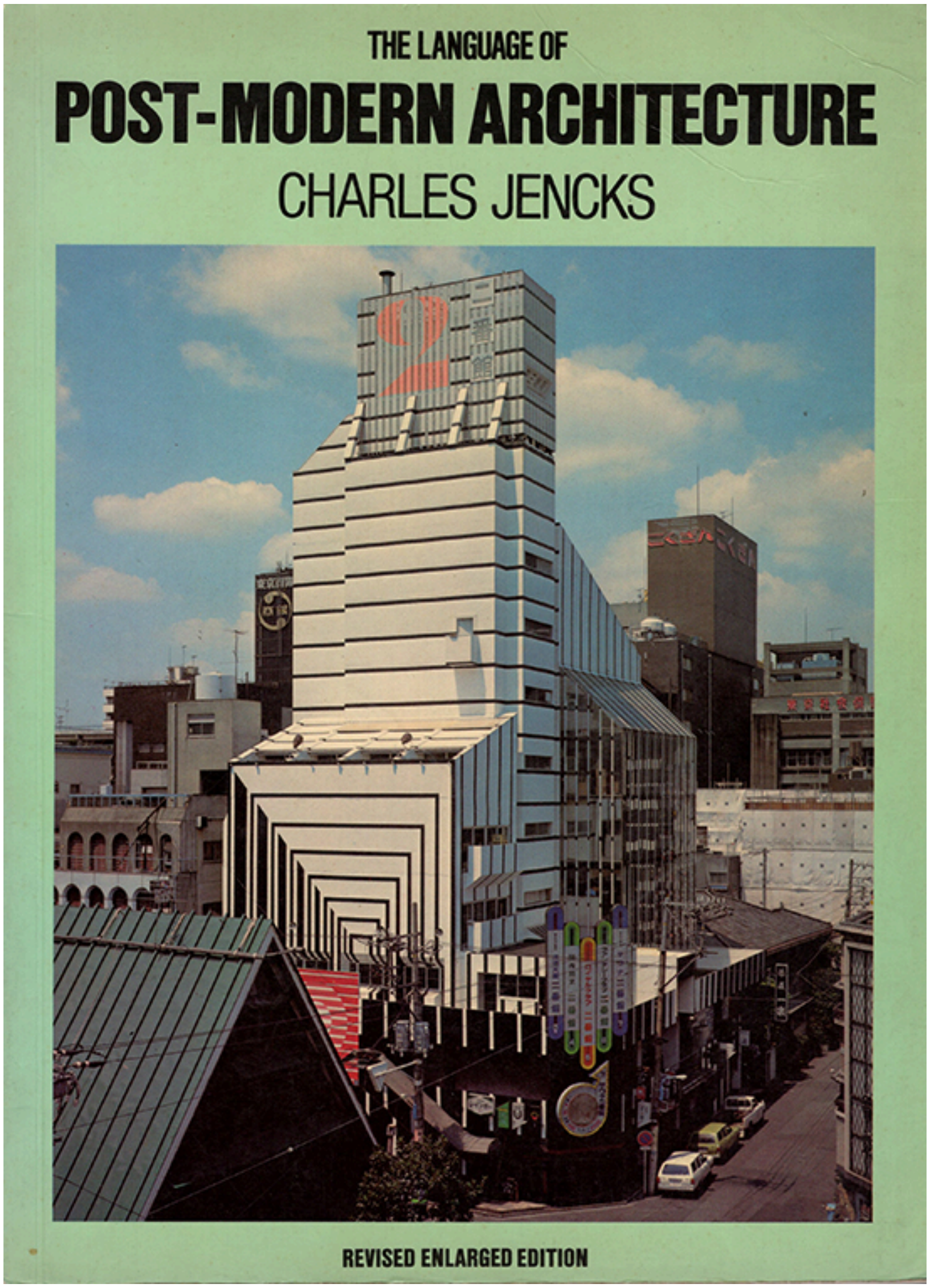

Figure 4.24

Ni-Ban-Kahn, Tokyo, Japan, redesigned in 1977, featured on the cover of Charles Jencks, *The Language of Postmodernism* (1977)*,* revised edition.

Figure 4.25

"Species of Birds," in Anthony Lumsden's "Preconception Analysis." From: *Space Design* (Nov 1993), p. 8.

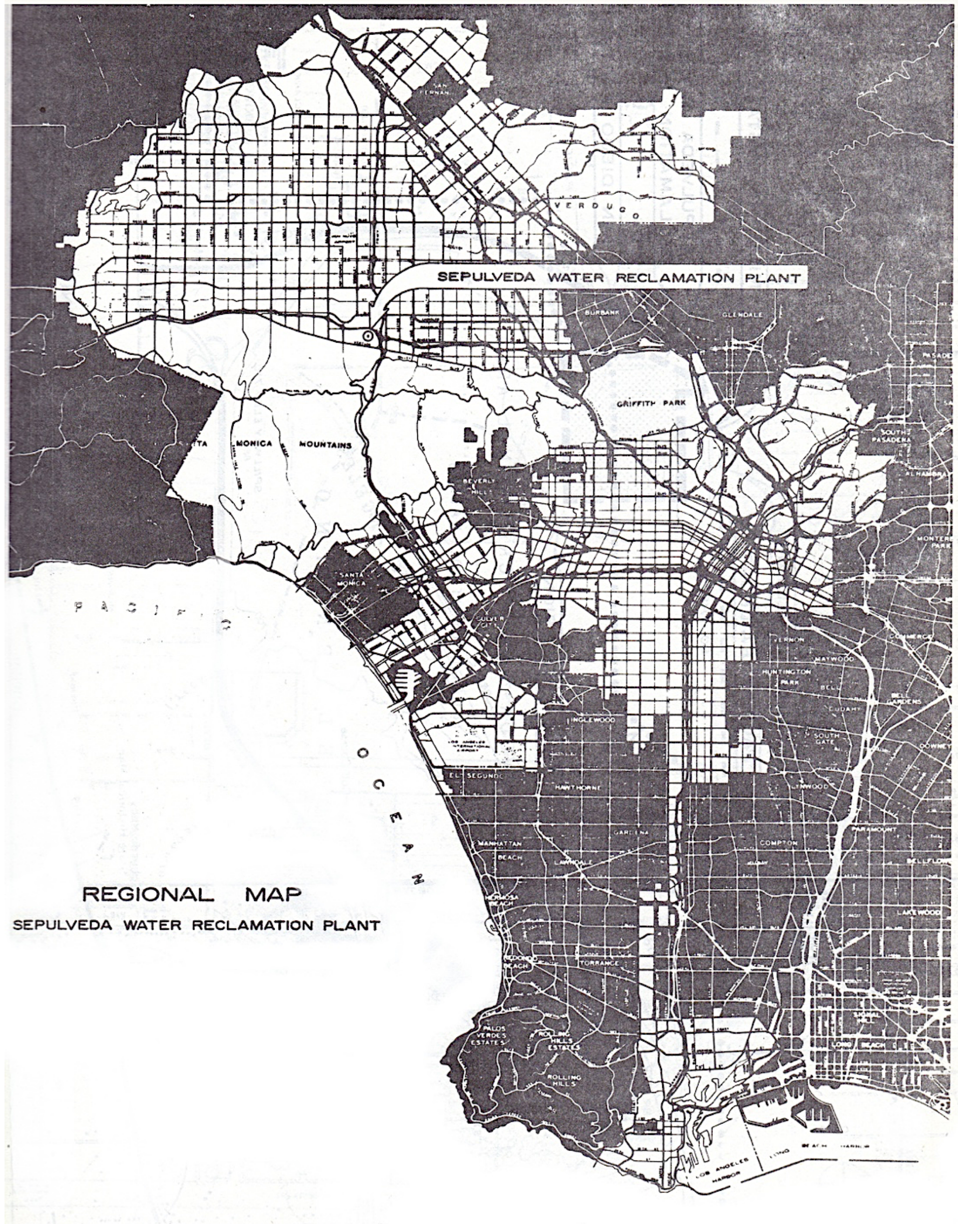

Figure 4.26

Regional map and proposed location of Sepulveda (Donald C. Tillman) Wastewater Treatment Plant, 1975. From: *Environmental Impact Report: Sepulveda Water Reclamation Plant,* 1975.

Figure 4.27

Aerial of proposed site for the Sepulveda (Donald C. Tillman) Wastewater Treatment Plant. From: *Environmental Impact Report: Sepulveda Water Reclamation Plant,* 1975.

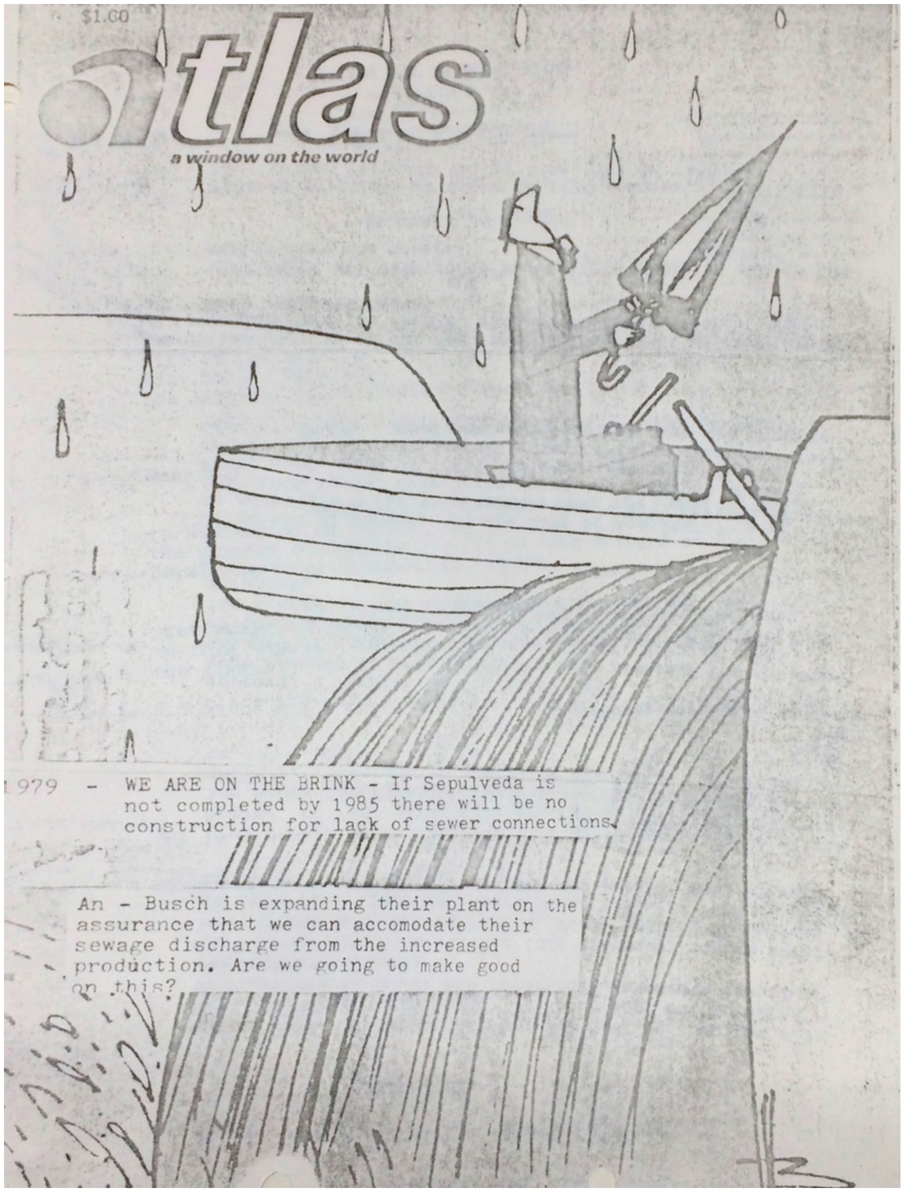

Figure 4.28

Cover of Committee Report prepared for the Industrial Association of the San Fernando Valley, 1979. Industrial Association of the San Fernando Valley Collection, CSU Northridge Special Collections, Northridge, CA.

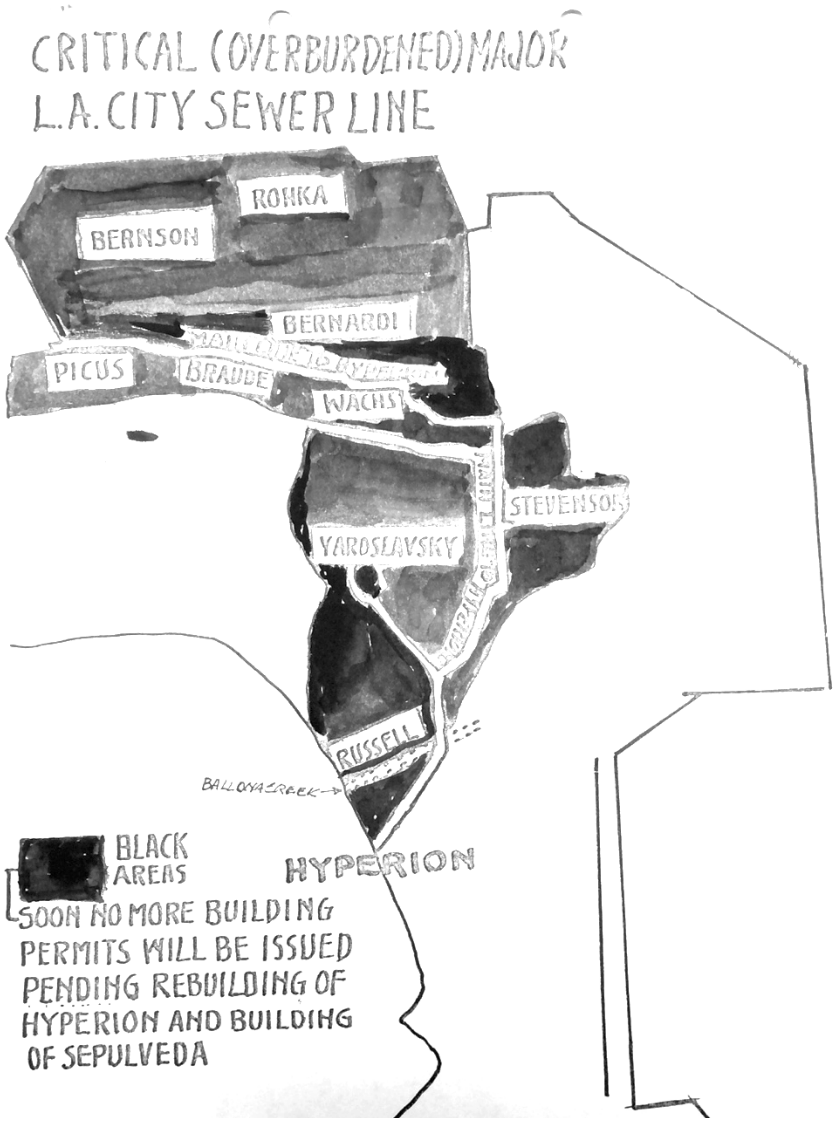

Figure 4.29

"Black Areas" Barring Construction in the Los Angeles Area due to impending over-capacity of the city's sewer system, 1979. Industrial Association of the San Fernando Valley Collection, CSU Northridge Special Collections, Northridge, CA.

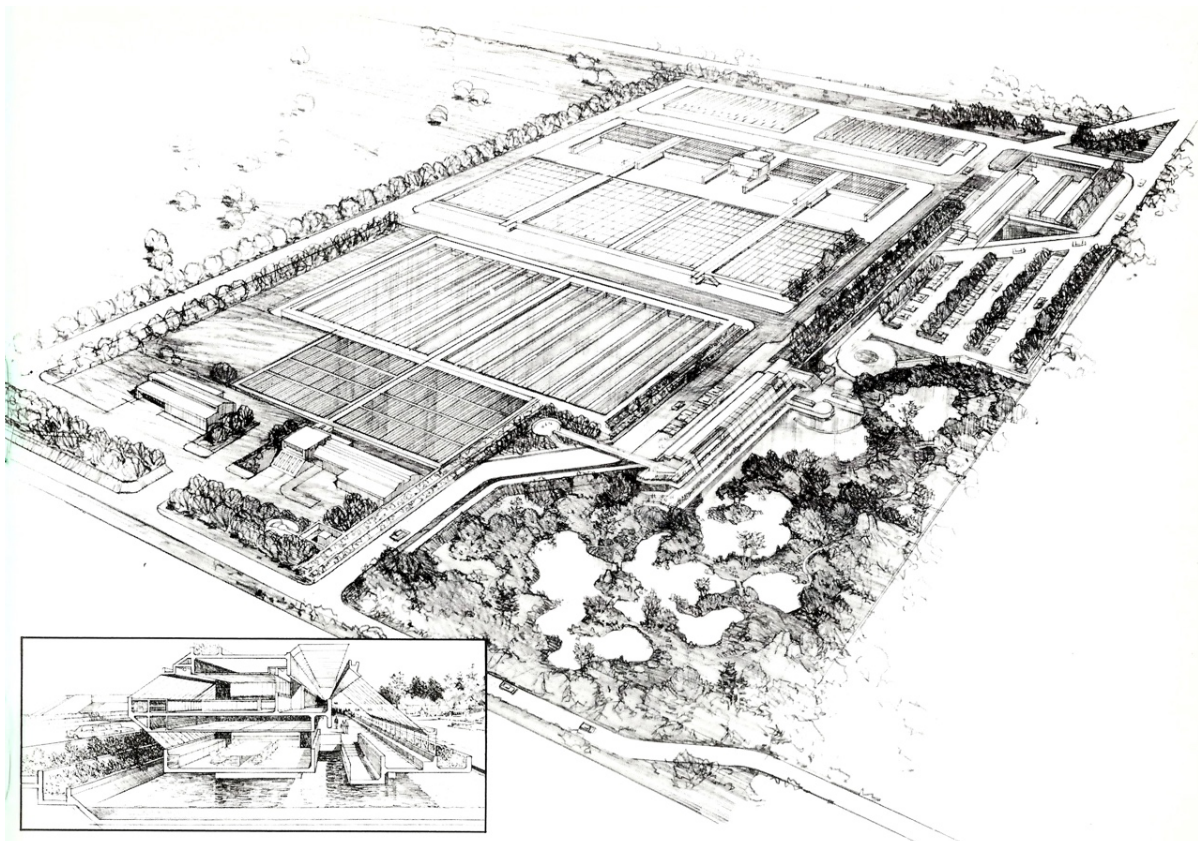

Figure 4.30

Aerial and section drawing of the proposed Sepulveda (Tillman) Water Reclamation Plant, 1973.
From: *DMJM Review,* (Fall 1973).

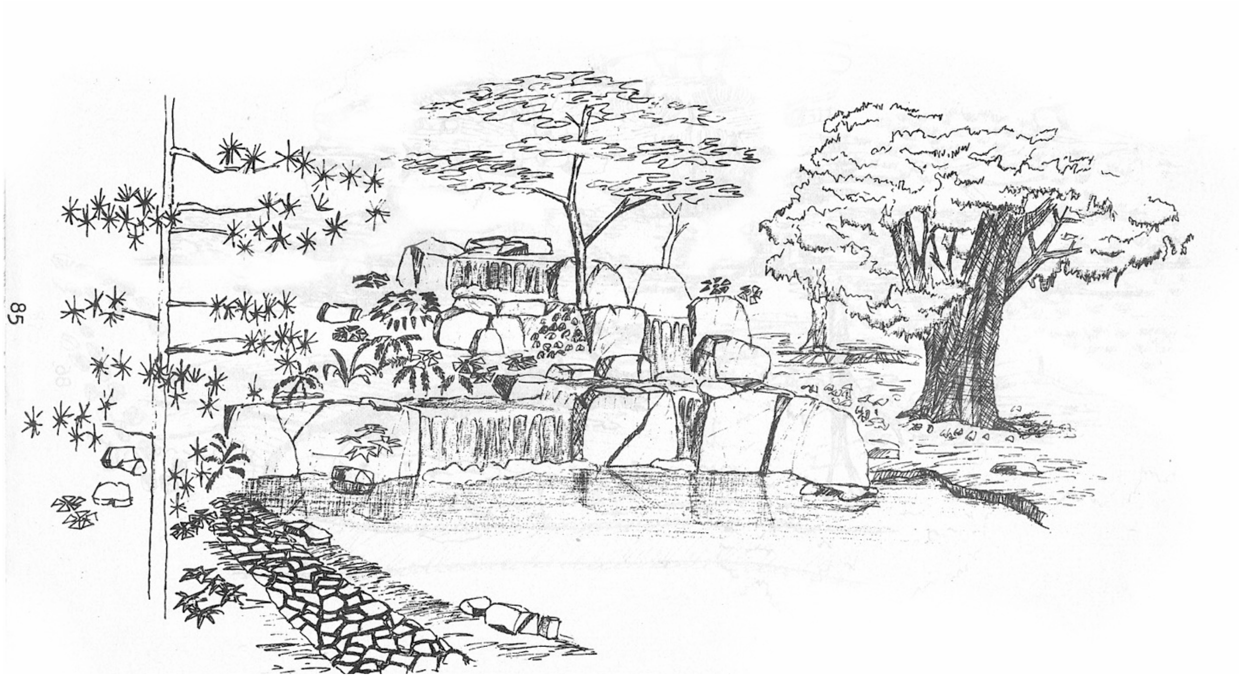

Figure 4.31

Drawing of proposed Japanese Gardens for the Sepulveda (Tillman) Water Reclamation Plant, 1973. From*: Environmental Impact Report: Sepulveda Water Reclamation Plant*, *1975.*

Figure 4.32

Aerial photograph of the Sepulveda (Tillman) Water Reclamation Plant. Tillman Wastewater Treatment Plant Archives, Van Nuys, CA

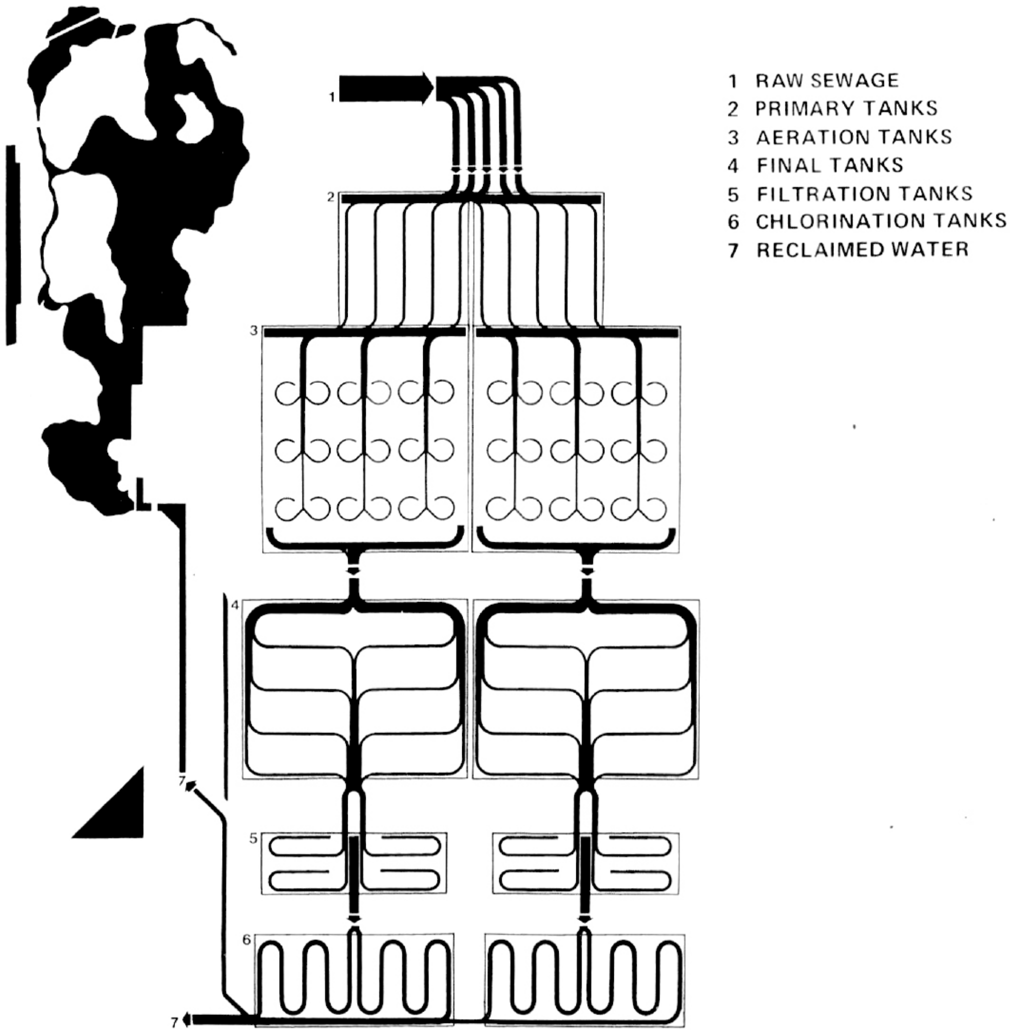

Figure 4.33

Anthony Lumsden, diagram of water filtering process at Tillman Wastewater Reclamation Plant, Van Nuys, CA, built in 1984. From: *Space Design* (1993), p. 12.

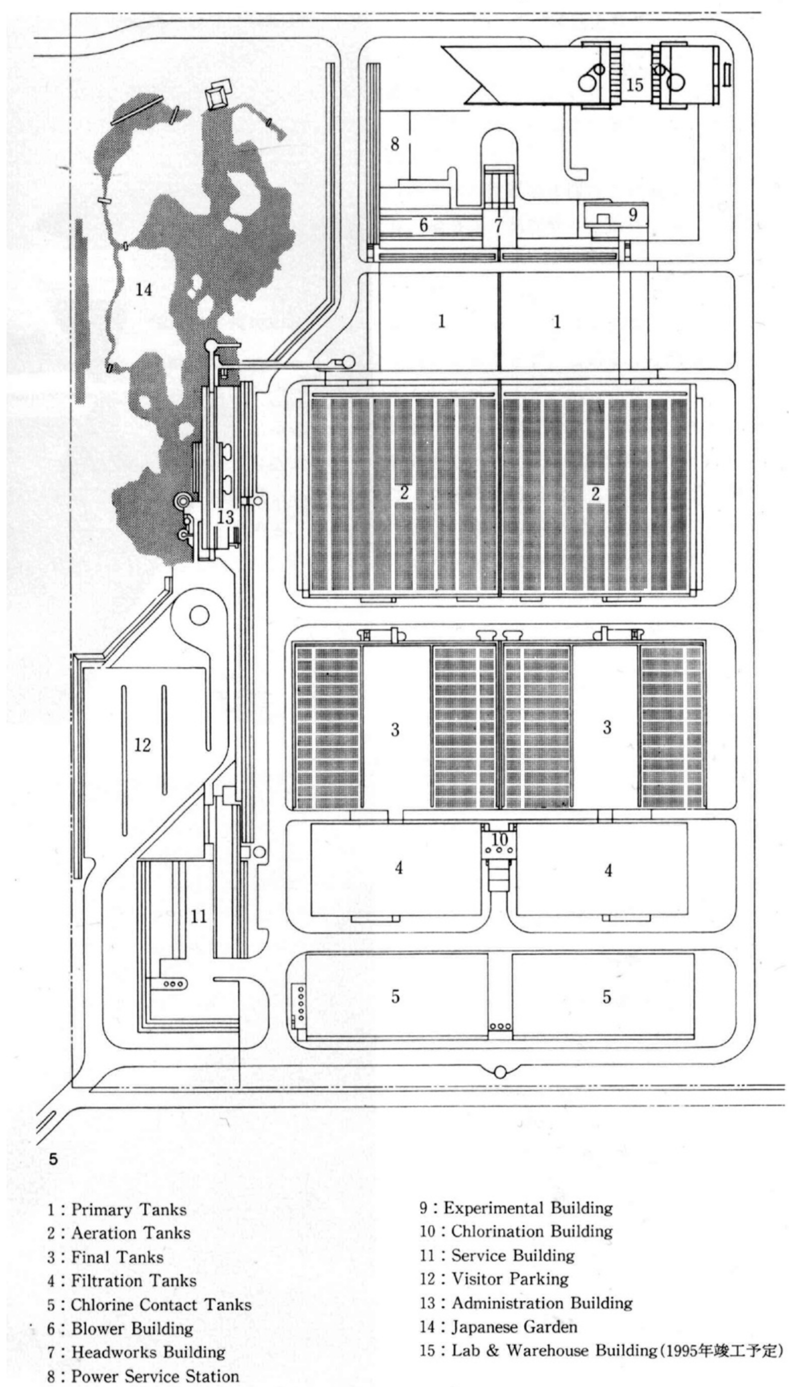

Figure 4.34

Site plan of Tillman Wastewater Reclamation Plant, Van Nuys, CA, built in 1984. From: *Space Design* (1993), p. 12.

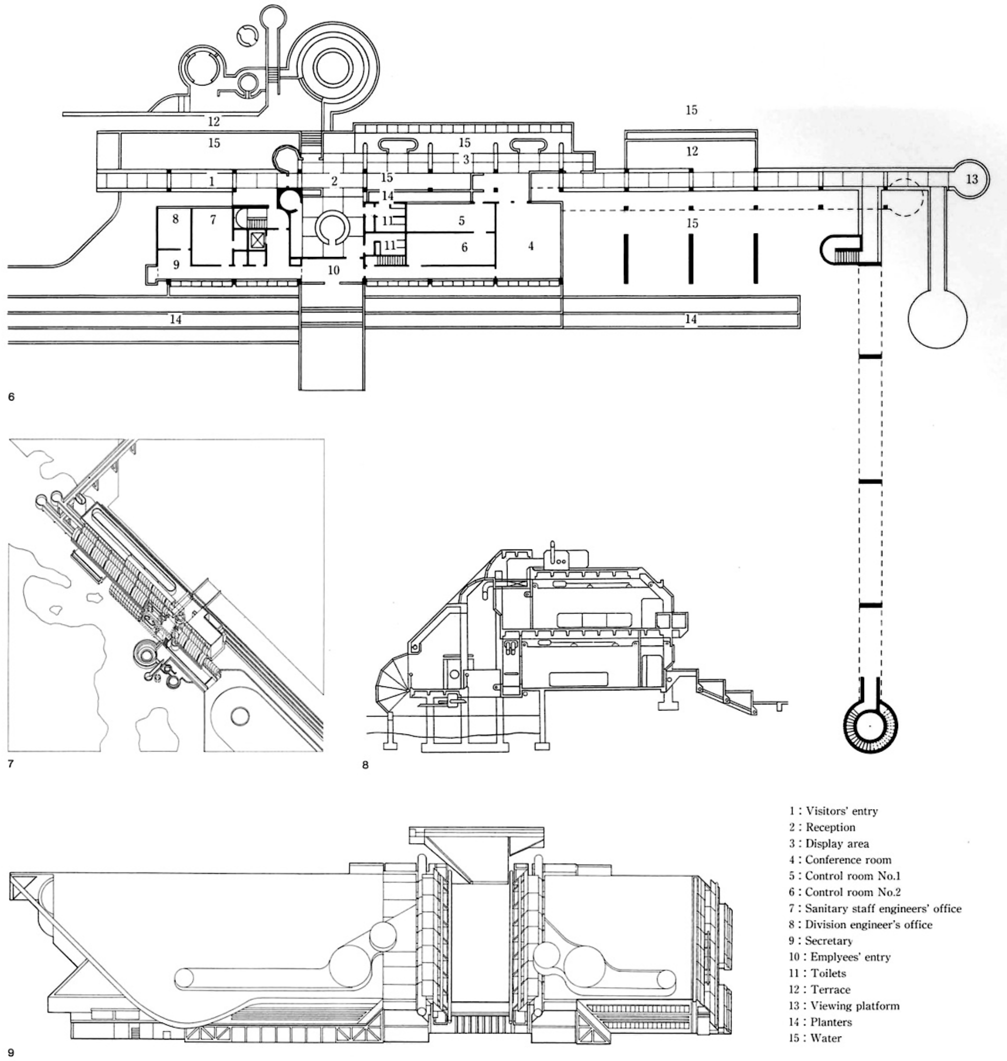

Figure 4.35

Plan, sections, and axonometric drawings of the administration building at Tillman Wastewater Reclamation Plant, Van Nuys, CA, built in 1984. From: *Space Design* (1993), p. 13.

Figure 4.36

Construction of administration building at Tillman Wastewater Reclamation Plant, Van Nuys, CA ca. 1983. Source: Tillman Wastewater Treatment Plant Archives, Van Nuys, CA.

Figure 4.37

Tillman Wastewater Treatment Plant, Van Nuys, CA, designed in 1973 and built in 1984. Photo by author, 2016.

Figure 4.38

Photos of interior and exterior of Tillman Wastewater Reclamation Plant, designed in 1973 and built in 1984. Photos by author, 2016.

News-Record. DMJM also placed among the top 10, and Williams Brothers was in the top 50.

Based in Orange, Calif., Holmes & Narver has more than 50 years of experience in providing complete engineering, procurement, construction and construction management services to industrial and governmental clients worldwide. The firm has a growing presence in the international market for operations and maintenance services. In 1984, Holmes & Narver and a joint venture partner designed and installed the computerized security system for athletes' living areas at the Olympic Games in Los Angeles.

With headquarters in Tulsa, Okla., Williams Brothers is an engineering and management firm providing services to the energy industry. The firm is in its ninth year as operator of the 46,000-acre Naval Petroleum Reserve at Elk Hills, Calif. Williams Brothers is also a leading supplier of pipeline engineering services on the Alaskan North Slope.

Consistently ranked a leading design firm, DMJM provides professional services to public and private clients from more than 30 offices worldwide. Its expertise covers five basic fields: architecture, transportation, civil engineering and planning, energy systems, and industrial and defense facilities. Based in Los Angeles, DMJM has an international reputation for outstanding design, technological advances, strong project management and strict cost and schedule control. Among recently completed projects are joint venture construction management of a $700 million expansion of the Los Angeles International Airport, and an Aeropropulsion Systems Test Facility in Tullahoma, Tenn. Designed in a joint venture for the U. S. Air Force Systems Command, the award-winning facility tests turbofan and turbojet aircraft engines at simulated speeds and altitudes of up to Mach 3.4 and 75,000 feet.

Riley-Stoker has headquarters in Worcester, Mass., and designs, manufactures and constructs steam-generating and fuel-burning equipment for electric utility and industrial customers. Multisolids fluid bed combustion (MSFBC) and resource recovery technologies are key growth areas for Riley Stoker. The MSFBC technology permits clean, economical burning of multiple low-grade fuels without the need for costly scrubbers.

Riley Stoker has begun to penetrate the growing

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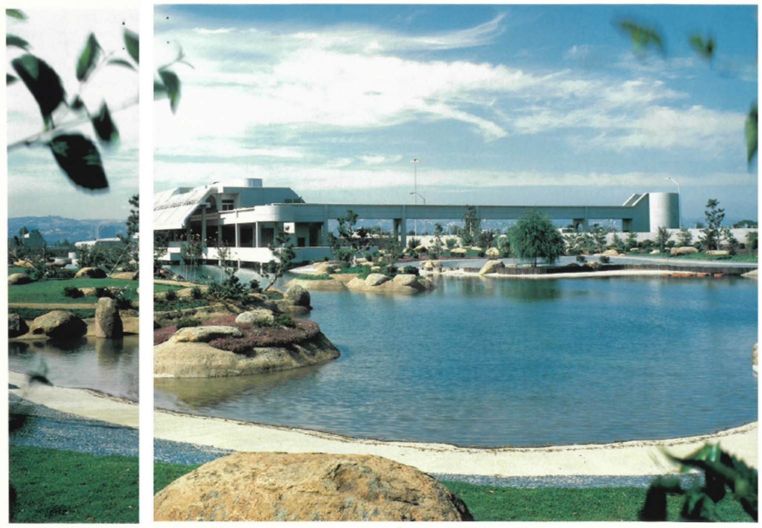

■ Above: Designed by DMJM and completed in 1984, the Tillman Water Reclamation Plant at Los Angeles treats 40 million gallons of water a day for irrigation and recreation uses in California's San Fernando Valley.

■ Right: The Aeropropulsion Systems Test Facility at Tullahoma, Tenn., demonstrates DMJM's expertise in advanced technology projects.

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Figure 4.39

Tillman Wastewater Reclamation Plant as featured in Ashland Oil Company's 1984 Annual Report. From: Ashland Oil Co., *Annual Report,* 1984.

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