Vision in Motion:

Architectural Space Time Notation and Urban Design, 1950-1970

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INTRODUCTION

In 1941, Hungarian architect Ernö Goldfinger wrote an article for *Architectural Review* in which he assessed the existing tools of architectural representation and found them wanting: "Architecture, a three-dimensional spatial creation," he wrote, "can only be hinted at by a two-dimensional representation such as a photograph, a perspective, etc., and while looking at these no spatial sensation can possibly be experienced, but only imagined.... This difficulty in illustrating the spatial sensation, the *being within*, is a great handicap for criticism and comprehension."[1] Over the late 1950s and early 1960s, several architects and planners in the United States developed complex graphic systems that attempted to capture in two dimensions the complex spatial experience to which Goldfinger referred. These notation systems were designed to record the perceptual, sequential and temporal experience of movement at the larger scale of the urban landscape from ground-level perspective, unlike traditional architectural drawings that presented static views or plans and models, which evoked the aerial view from above. They emerged at a time when American cities were being drastically restructured and remade through urban renewal and interstate highway construction. The awareness that change could be effected at a larger scale and increased speeds contributed to a sense that architects were facing new challenges that required a more comprehensive set of tools. These notations were seen as such a tool and were proposed to enable greater flexibility

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[1] Ernö Goldfinger, "The Sensation of Space," *The Architectural Review* 90 (November 1941): 129.

in design by privileging visual progression and sequential experience. The notation developed by Kevin Lynch, Donald Appleyard, and John Myer at the Massachusetts Institute of Technology, for example, focused on the high speed journey by car and was intended to enable an approach to urban design that incorporated the experience of traveling on the newly developing circumferential urban freeway. The system created by architect Philip Thiel, on the other hand, was designed for the experience of walking in an attempt to refocus attention on the importance of designing pedestrian-friendly urban spaces, while the movement notation produced by landscape architect Lawrence Halprin was intended to be used for both speeds of movement.[2] (figs. 0.1-0.3) The contrasting approaches of the notations reflected the mid-twentieth century tension in city planning between designing the city for the pedestrian versus the automobile, two means of travel and speeds of movement that were, at the time, coming into increasing conflict with one another in cities across the country.

Each of these architectural space time notation systems was developed, tested, and revised over a period of time between the late 1950s and mid 1960s. Visually, each notation system was unique, yet all consisted of fairly abstract symbols that were read from left to right or bottom to top along a background framework that marked the progression of distance and time. While each notation was intended to stand alone as a visual representation of space, most were accompanied by some combination of annotated site plans, serial photographs, and textual description that were necessary to decipher and translate the spatial experience being recorded. Many of the planners who

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[2] Thiel's was first published as "A Sequence Experience Notation for Architectural and Urban Spaces" in *The Town Planning Review* in 1961; the MIT Team's notation first appeared in *The View from the Road* in 1964; and Halprin's was published as "Motation" in *Progressive Architecture* in 1965.

created these architectural notations noted the influence of performance notations such as music and dance and cited them as precedents to the development of their own systems.[3] Just as in music notation, they argued, the space time notations charted series of events occurring at particular times, marked against a background staff. Dance notation such as Labanotation, developed by German choreographer Rudolf Laban in 1926, charted the sequential movements of a dancer's body over metered time from the perspective of the dancer, but it did not attempt to describe the environment for movement.[4] (fig. 0.4) However, these parallels to music and dance notations were more metaphorical than substantive and revealed some of the critical flaws of the architectural notations that may have ultimately prevented them from being incorporated into mainstream architectural practice. The inability of the planner to completely control how visitors would move through an urban space, for example, was never truly discussed by any of the notations' creators. While music and dance notations detailed a controlled and choreographed final product – either specific musical notes to be played or dance steps to be performed – in the finite space of a stage and time of a given performance, the architectural notations

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[3] The efficiency diagrams developed by Lilian Gilbreth in the early twentieth century to map the modern kitchen for ease of access similarly attempted to create a form of notation that could capture movement through space; however, the notation authors did not directly cite her work as they did music and dance notation. See the following for more on Gilbreth's diagrams: Frank B. Gilbreth and Lillian M. Gilbreth, *Applied Motion Study: A Collection of Papers on the Efficient Method to Industrial Preparedness* (New York: Sturgis & Walton Company, 1917); Frank B. Gilbreth and Lillian M. Gilbreth, "Process Charts: first steps in finding the one best way to do work," paper transcript, annual meeting of the American Society of Mechanical Engineers, New York, December 5-9, 1921; Lilian M. Gilbreth, *The Home-Maker and Her Job* (New York: D. Appleton and Company, 1927); Lillian M. Gilbreth, "Efficiency Methods Applied to Kitchen Design," *Architectural Record* 67 no. 3 (March 1930): 291-294; William M. Spriegel and Clark E. Myers, *The Writings of the Gilbreths* (Homewood, IL: Richard D. Irwin, Inc., 1953); and Lillian M. Gilbreth, Orpha Mae Thomas and Eleanor Clymer, *Management in the Home: Happier Living Through Saving Time and Energy* (New York: Dodd, Mead & Company, 1954).

[4] Ann Hutchinson Guest, *Dance Notation: The process of recording movement on paper* (New York: Dance Horizons, 1984) 42-45 and Guest, "A Brief Survey of 53 Systems of Dance Notation," *Quarterly Journal of the National Centre for the Performing Arts* 14 no. 1 (March 1985): 1-2. See chapter 3 for a more in-depth analysis of the influence of dance notation.

attempted to record movement through an urban environment that was unrestricted in both time and space. Moreover, beyond simply attempting to record space after the fact, all of the planners who developed these notations alleged that their systems could be used as tools to help designers consider how the experience of movement, sequence, and progression through space could inform larger architectural and urban design choices before a single brick had been laid. This gap between recording an actual experience and designing space to achieve an imagined experience is one that is never fully addressed by the notation systems. These practical and theoretical oversights may have contributed to the ultimate failure of the notation systems to achieve their goal as widely used planning tools in architecture and urban design.

One of the basic assumptions of the notation systems discussed in this dissertation was that the spatial experience was dynamic and defined by the sequential and temporal patterns and rhythms of movement through the city fabric. Seen from an historical viewpoint, the incorporation of rhythm, patterning, and sequence in architecture and landscape is nothing new. The journey through an Egyptian temple or a Gothic cathedral, for example, was carefully modulated through light and enclosure to create a deepening sense of wonder and convey the transition from the profane to the sacred.[5] Similarly, the English landscape gardening practices of the eighteenth and nineteenth centuries were based upon the careful study and manipulation of the individual's movement through the natural features of the landscape.[6] The idea of sequentially recording the environment

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[5] Philip Thiel, "Processional Architecture," *AIA Journal* 41 no. 2 (February 1964): 23.

[6] See John Dixon Hunt and Peter Willis, eds., *The Genius of the Place: The English Landscape Garden 1620-1820* (London: Paul Elek, 1975); and Michel Conan, ed., *Landscape Design and the Experience of Motion, 1550-1850* (Washington, D.C.: Dumbarton Oaks Research Library and Collection, 2003).

from the perspective of the individual also has a long history, as evidenced by the strip maps of the nineteenth century that charted the notable vistas and views of the traveler along a specified journey between cities.[7]

This concept of designing the urban fabric from the moving perspective of the individual is one that also reappears in architectural discourse of the late nineteenth through twentieth centuries. In his landmark book of 1889, *City Planning According to Artistic Principles*, Austrian architect Camillo Sitte insisted that the city be seen as a continuous fabric in which elements were rhythmically related and spaces were arranged in appealing patterns and sequences. In his critique of the open spaces along the new Viennese Ringstrasse, Sitte urged the creation of a sequence of plazas to increase visual effect and evoke a sense of enclosure, privileging the embedded viewpoint of the pedestrian within the fabric.[8] Just ten years later, in *Histoire de l'Architecture*, French historian Auguste Choisy famously praised the processional nature of the experience of the Athenian Acropolis, where beauty emerged in the sequence of visual experiences and where buildings were meant to be seen neither statically nor head-on.[9] This analysis, made at the end of the 19th century, echoed throughout the 20th in the work of many others, including Sergei Eisenstein and Le Corbusier. Le Corbusier in fact used Choisy's

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[7] See Edward R. Tufte, *Envisioning Information* (Cheshire, CT: Graphics Press, 1990), 112-113; and P.D.A. Harvey, *The History of Topographical Maps: Symbols, Pictures, and Surveys* (London: Thames and Hudson, 1980), 181.

[8] Camillo Sitte, *City Planning According to Artistic Principles*, trans. Christiane Crasemann Collins and George R. Collins, in *Camillo Sitte and the Birth of Modern City Planning*, ed. Christiane Crasemann Collins and George R. Collins (Mineola, NY: Dover Publications, Inc.: 1986). In *Representation of Places: Reality and Realism in City Design*, Peter Bosselmann noted that Sitte's graphic techniques "combined concept and experience. He produced comparative map studies of well-dimensioned urban places and eye-level drawings mainly of cities…. He used graphic representations to exemplify physical enclosure and spatial definition." See Peter Bosselmann, *Representation of Places: Reality and Realism in City Design* (Berkeley: University of California Press, 1998), 35.

[9] Auguste Choisy, *Histoire de l'Architecture, Vol. 1* (Paris, 1899), 411-418.

diagrams of the Acropolis – albeit without attribution – to illustrate his *Vers une Architecture* of 1923.[10] Le Corbusier's own concept of the "promenade architecturale," or the act of experiencing architecture through walking, was itself widely circulated at the time.[11]

In 1924, artist Laszlo Moholy-Nagy published a score for a musical variety show in the Bauhaus book, *The Theater of the Bauhaus*, which recorded the simultaneous performance events on a tripartite stage.[12] (fig. 0.5) Titled "Sketch for a Score for a Mechanical Eccentric," it coordinated the movements, music, sound effects, lighting, film screenings, colors, and scents on each of the three portions of the stage over the course of the show.[13] The score was organized in four vertical columns, each devoted to a different set of effects, and progressed sequentially and temporally from the top of the page downwards. The score represented Moholy-Nagy's concept of a theater of totality that would synthesize all art forms into a single performance and was evocative of the Bauhaus philosophy that encouraged learning from all artistic disciplines, from film and

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[10] See Richard A. Etlin, "Le Corbusier, Choisy, and French Hellenism: The Search for a New Architecture," *Art Bulletin* 69 no. 2 (June 1987): 264-278 and Sergei Eisenstein, "Montage and Architecture," *Assemblage* no. 10 (December 1989): 110-131.

[11] Richard A. Etlin, "A Paradoxical Avant-Garde: Le Corbusier's Villas of the 1920s," *The Architectural Review* 181 (January 1987): 21-32.

[12] Walter Gropius, ed., *The Theater of the Bauhaus*, trans. Arthur S. Wensinger (Baltimore: The Johns Hopkins University Press, 1996), with essays by Oskar Schlemmer, Laszlo Moholy-Nagy, and Farkas Molnár. This is a translated reprint of the first edition, *Die Bühne im Bauhaus*, which was written in German and published in 1924 by Albert Langen Verlage München. It was the fourth volume in the series of Bauhaus Books (Bauhausbücher) produced during the school's tenure. See Gropius, *Theater of the Bauhaus*, 105-106 (translator's note).

[13] Laszlo Moholy-Nagy, "Theater, Circus, Variety," in Gropius, *Theater of the Bauhaus*, 48. The score itself is inserted as a fold-out between pages 48 and 49 of the 1996 edition and is translated as "Sketch for a Score for a Mechanized Eccentric."

painting to theater and architecture.[14] The score, which is more akin to dance and music notation in the way it choreographed finite and controlled events on stage, is more abstract art than accurate recording, combining floating arrows and constructivist visual forms with bands of color meant to signify lighting and color effects; music and sound are indicated only schematically through dots against a background staff on the right.

Although Moholy-Nagy did not develop his score of 1924 into any kind of formalized system of scoring, he continued to explore the potential of artistic representation to capture vision and movement. In 1928, Moholy-Nagy published his book, *Von Material zu Architektur*, in which he wrote of how space could be experienced most directly through movement and vision.[15] He wrote: "Each of the senses with which we record the position of bodies helps us to grasp space. Space is known first of all by the sense of vision. This experience of the visible relations of bodies may be checked by movement – by the alteration of one's position – and by means of touch.[16] This interest in spatially representing movement and time in architecture was discussed by Sigfried Giedion as a notable characteristic of many of the new developments in modern art and architecture in his Charles Eliot Norton Lectures at Harvard University between 1938 and 1939 and later published in his seminal book of 1941, *Space, Time, and Architecture*.[17] Gyorgy Kepes, who was one of Moholy-Nagy's colleagues at the latter's school, the New

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[14] The founder of the Bauhaus, Walter Gropius, developed a design for a "Total Theater" in 1926 (Gropius, *Theater of the Bauhaus*, 10-14).

[15] The text was published in English two years later. See Laszlo Moholy-Nagy, *The New Vision: From Material to Architecture* (New York: Brewer, Warren & Putnam, Inc., 1930).

[16] Laszlo Moholy-Nagy, *The New Vision 1928 fourth revised edition 1947 and Abstract of an Artist* (New York: George Wittenborn, Inc., 1947), 57.

[17] Sigfried Giedion, *Space, Time and Architecture* (Cambridge, MA: Harvard University Press, 1941).

Bauhaus in Chicago, similarly wrote in his book, *The Language of Vision* of 1944, about the power of visual language to capture the faster speeds and quicker movements of contemporary life.[18] Moholy-Nagy developed many of his ideas further in his second book, *Vision in Motion*, which was published posthumously by his wife, Sibyl Moholy-Nagy, in 1947. In this work, he detailed the instructional methodology of his design school by elaborating on his fundamental concept of the interrelatedness of art and life. For Moholy-Nagy, the artist could reintegrate art and life by seeking new ways of representing the connection between vision and movement. He wrote: "Vision in motion is a synonym for simultaneity and space-time: a mean to comprehend a new dimension. Vision in motion is seeing while moving."[19]

In the 1940s and 1950s, British architect Gordon Cullen developed his own version of Moholy-Nagy's concept of vision in motion, which he called "serial vision." Published as part of his studies on Townscape in the pages of *Architectural Review*, serial vision was the sequence of vistas and revelations through which the scenery of towns was revealed.[20] (fig. 0.6) Cullen urged the designer to be aware of the individual's sense of his own position in the larger environment and to pay attention to psychological and proprioceptive shifts such as "here and there" and change of level and enclosure. The journey through the city was a dynamic experience that the designer could heighten by manipulating relationships between existing and emerging views, pressure and vacuum,

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[18] Gyorgy Kepes, *The Language of Vision* (Chicago: Paul Theobald, 1944).

[19] Laszlo Moholy-Nagy, *Vision in Motion* (Chicago: Paul Theobald, 1947), 12.

[20] See Gordon Cullen, "Townscape Casebook," *Architectural Review* 106 no. 636 (December 1949): 363-374; and Gordon Cullen, "Here and There," *Architectural Review* 124 no. 742 (November 1958): 327-330. In 1961, Cullen published a book that contained many of his articles on Townscape from the previous years. See Gordon Cullen, *Townscape* (London: Architectural Press, 1961). For more on Cullen, see David Gosling, *Gordon Cullen: Visions of Urban Design* (London: Academy Editions, 1996).

exposure and enclosure, and constraint and relief. Cullen's drawings conveyed a sense of space by graphically depicting the experience of the pedestrian in motion. In 1959, Steen Eiler Rasmussen expanded upon Cullen's townscape studies in his text, *Experiencing Architecture*, writing about factors such as scale, texture, rhythm, and proportion in architecture and urban design. For Rasmussen, these elements came to life and could only be experienced by the individual in motion through the city's spaces.[21] At the same time, beginning in the late 1950s, Guy Debord, Constant Nieuwenhuys and the International Situationists developed their own approach to walking through the city, which they called "dérive." Dérive consisted of aimless, uncontrolled wandering journeys through the unstructured spaces of an imaginary city they labeled "New Babylon." The psychogeographical contours of this city could be freely mapped, unrestricted by determinative structures, in order to unearth the true identity and meaning of the city's spaces.[22] (fig. 0.7) Indeed, all of the systems of notation discussed in this dissertation were informed and influenced by this fairly widespread discourse in architecture and urbanism on movement, vision, and the possibilities of representing space and time from the ground-level perspective.

Although the notation systems were summarized in a handful of reports in the decade immediately following their publication, these texts written on the notations between 1966 and 1974 merely described their attributes without analyzing their development or influences, effectively pigeonholing them as simply another variant of

[21] Steen Eiler Rasmussen, *Experiencing Architecture*, trans. Eve Wendt (Cambridge, MA: Technology Press of the Massachusetts Institute of Technology, 1959).

[22] See Mark Wigley, *Constant's New Babylon: The Hyper-Architecture of Desire* (Rotterdam: Center for Contemporary Art, 1998) and Simon Sadler, *The Situationist City* (Cambridge, MA: MIT Press, 1998).

architectural representation. In 1966, an architecture student at the University of Washington, Thomas Casey, wrote a master's thesis in which he reviewed contemporary work on architectural methods of describing urban form. He included the architectural notation systems in his analysis, but summarized and assessed each one in a handful of pages, focusing mainly on issues such as ease of use and visual framework.[23] The notations were also included in a scientific article of 1970 titled "Environmental Psychology," in which the author, Kenneth Craik, briefly mentioned the architectural notations as exemplars of attempts in non-scientific fields to map the sequential ecological environment.[24] In 1971, Richard Saul Wurman prepared an issue of *Design Quarterly* called "Making the City Observable" in which he reviewed many of the mapping techniques in use at the time, from atlases and subway maps to comparative city maps and Michelin's Green Guides. Two of the notation systems – Halprin's and the MIT team's – were illustrated only briefly and were accompanied by minimal text, most of which had been excerpted directly from the sources in which the notations had first been published.[25] Between 1971 and 1974, Robert Buchanan, the chairman of landscape architecture at the University of Washington, prepared a study titled "Notation Systems

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[23] Thomas Casey, "A Proposed Method for the Description of Urban Form" (master's thesis, University of California, Berkeley, 1966): 8-12, 21-27. Two other reports were published during this time that similarly referenced the work of the MIT authors and Thiel, but were much less clear in their methodology. See M. R. Wolfe and R. D. Shinn, *Urban Design within the Comprehensive Planning Process* (Seattle: University of Washington, 1970); and Eftimios G. Mitropoulos, "Space Networks: Towards Hodological Space Design for Urban Man, Starting with a Cognitive/Perceptual Notation" (PhD diss., University of Edinburgh, Department of Architecture, 1974).

[24] Kenneth Craik, "Environmental Psychology," in *New Directions in Psychology IV*, 3-121 (New York: Holt, Rinehart and Winston, Inc., 1970), 80-83.

[25] Wurman did note that while the MIT team's notation could be useful for the student, he wondered about the general applicability of Halprin's notation. See Richard Saul Wurman, "Appleyard, Lynch and Myer's View from the Road," "Halprin's RSVP Cycles," and "Lynch's Image of the City," all in *Design Quarterly* 80 (1971): 44-47.

for the Visual Evaluation of Urban and Natural Landscapes" in which he analyzed 53 different systems of annotating spatial and environmental data on paper. Although the notation systems discussed in this dissertation were included, only their main features were described; moreover, they bore little resemblance to the other systems studied, many of which consisted of aerial map diagrams that represented, for example, data on land use and resource allocation.[26]

These brief reports and articles comprise the extent of the research on the notation systems as a whole so far and function primarily as status reports on contemporary developments in representation. The notation systems discussed in this dissertation, which sought to map and record experience sequentially from the point of view of the individual within the city fabric, were seen solely as part of a much larger movement to acquire environmental data. While the notation systems certainly did represent an attempt at visual data acquisition, their compelling time-based format warrants further study. In recent scholarship, each notation has usually been discussed on its own, as one work within the given author's larger oeuvre and oftentimes as an oddity or passing fancy.[27] None of the scholarship on these notation systems – recent or otherwise – has

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[26] The study began as a NEA grant. See Robert T. Buchanan, "Notation Systems for Visual Evaluation of Urban & Natural Landscapes," 1971, Folder "Status Report: Sept. 1971 - Notation Systems for Visual Evaluation of Urban & Natural Landscapes," call no. 014.I.A.6338, Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania, Philadelphia (hereafter Halprin Collection). In 1974, it was published in two different forms. One was published by Buchanan and another was published by his research assistant, Stephen Amsbaugh, as part of the latter's Masters degree for Urban Planning at the University of Washington. See Robert T. Buchanan, *Notation Systems for the Visual Evaluation of Urban and Natural Landscapes* (NEA Report, Seattle, 1974) and Stephen H. Amsbaugh, "The Use of Visual Notation Systems in Urban Design Analysis" (master's thesis, University of Washington, Seattle, 1974).

[27] See, for example *Lawrence Halprin: Changing Places* (San Francisco: San Francisco Museum of Modern Art, 1986); Tridib Banerjee and Michael Southworth, *City Sense and City Design: Writings and Projects of Kevin Lynch* (Cambridge, MA and London: MIT Press, 1990); Bob Jarvis, "People, Paths, and Purposes," *Urban Design Quarterly* no. 82 (Spring 2002): 22-26. In Thiel's case, over the years, students from other universities contacted him for information on his notation and permission to publish it in various

sought to determine how the notation systems developed, what factors influenced their creation, how they were used in practice by their creators, or what happened to the notation systems following their publication. Indeed, there are fascinating connections that begin to emerge between the creators of the notations, most of whom were connected to one of two fairly progressive American architecture schools: the Massachusetts Institute of Technology and the University of California, Berkeley. Connections between the notations and their creators cannot be explored without engaging in an in-depth examination of the notation systems themselves, from research and development through publication and application. Although this lack of scholarly attention is likely due to the fact that the notations were subjective, difficult to standardize, and ultimately did not succeed as widespread tools in architectural practice, the notations are worthy of study as a body of related work that reflects and engages many of the pressing architectural and urban issues of the mid-twentieth century, from large scale urban renewal and highway construction to debates on aesthetics and spatial perception in urban design.

This dissertation is organized in a largely chronological fashion and takes an approach that seeks to relate how the systems of notation developed in relationship to one another, occasionally in the same locale but more often on opposite coasts of the country. Chapter 1, *Highway Design, Urban Renewal and the Visual Tradition at MIT, 1951-1956*, lays the groundwork for the initial research on notation, which first emerged at the Massachusetts Institute of Technology in the early 1950s. This chapter examines how

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theses and papers. See Guy Coulon, "La Notation de l'Espace," (thesis, École Nationale supérieure des beaux-arts, France, 1977); Kasuhiko Miyauji, "Study of the Sequential Characteristics of Visual Space and Body Movement Including Analytical and Application Studies," (PhD diss., Hosei University, Japan, 1995); Despina Sfakiotaki, "Analysis of Movement in Sequential Space: Perceiving the traditional Japanese tea and stroll garden" (PhD diss., University of Oulu, Finland, 2005).

federal interstate highway and urban renewal programs transformed the Boston landscape in the mid-twentieth century and how this, in turn, influenced the emergence of the visual tradition at MIT. This tradition was embodied by Kevin Lynch and Gyorgy Kepes's Perceptual Form of the City Study, and developed in part from early discussions on parkways and aesthetics, as well as research on psychology and spatial perception. In Chapter 2, *Early Notation Research at MIT and Debates on Highway Aesthetics*, the highway research at MIT is discussed within the context of the lively debates on highway aesthetics and design at mid-century as well as the freeway revolts and early urban renewal protests of the late 1950s and 1960s, particularly within the city of Boston. Chapter 3 reviews many of the early notation publications and scores between 1960 and 1963, examining the development and publication of Philip Thiel's "Sequence-Experience Notation," the evolution of Lawrence Halprin's concept of scoring – for fountains, movement, and dance – as well as the early publication of the MIT team's highway notation. The influence of architectural pedagogy and studio workshops are also discussed, as they offered opportunities for the notation authors to further develop and test their notation systems in the safety of academia.

An analysis of the development of Halprin's score for the Bay Area Rapid Transit District and the publication of the MIT team's notation in the book, *The View from the Road*, comprises the majority of Chapter 4, which seeks to place both of these products of 1964 within the larger context of federal legislation and fallout from urban renewal and highway construction. Chapter 5, *Notation in Context, 1965: Lynch's Brookline Study & Halprin's Motation,* examines how the notation systems were used in each of the authors' cases during the year 1965. The application of notation in Kevin Lynch's Brookline study is examined, as is Halprin's engagement of avant-garde music and dance concepts in his publication of "Motation" of 1965. The sixth and final chapter, *Later Notation Research of the 1960s and 1970s*, begins by analyzing the directions in which the authors took their notation research in the following decades. Halprin's subsequent publications, including *Freeways* of 1966 and *RSVP Cycles* of 1969 are discussed, as are later publications at MIT on highways, psychology and cognitive mapping. The emergence of several other notation and mapping systems in the late 1960s and 1970s are described, as are contemporary texts of the 1970s and 1980s on highways, speed, spatial perception, and methods of architectural representation. Ultimately, this dissertation will consider how and whether a two-dimensional representational form such as a temporally based notation system can successfully capture the essentially four-dimensional spatial experience. Despite their flaws, these space time notations offer a compelling example of mid-century experimentation and engagement with the possibilities of urban design, fusing space and time into a single graphic representation by attempting to record the act of movement through the urban landscape.

CHAPTER 1

In the 1950s and 1960s, cities across America were engaged in urban renewal and interstate highway construction programs that revitalized downtown areas with new commercial, residential, and civic institutions as well as new transportation infrastructures that made it easier to access the central business district from the rapidly growing suburbs. The approach employed by these programs was one of large-scale clearance that has since been criticized for destroying historic neighborhoods and displacing minorities and the working class. These techniques, most often associated with the projects of the 1950s and 60s, were in fact preceded by a long history of federal programs that funded urban redevelopment and highway construction through and around cities.

The first federal legislation written to aid states with road construction was the Federal-Aid Highway Act of 1916, which established a system whereby the federal government would provide states with matching funds for road building. States initially funded their portion of the expense for highway construction through property taxes, poll taxes, and labor levies. These fees, however, were insufficient and states soon began to use car registration fees, bonds, and highway user taxes. The first statewide gas tax was instituted in Oregon, Colorado, and New Mexico in 1919 and spread to states across the country by 1929.[28]

In the 1920s, vehicle registration increased from 10.5 million to 26.7 million and the states responded by drastically augmenting highway construction. Road building was largely controlled by state committees rather than by county or city, due to the fact that smaller municipal bodies had revenue sufficient for only local road construction. This was particularly relevant after the passage of the Federal-Aid Highway Act of 1921, which stated that the federal government would provide matching funds to states for road construction that was primarily "interstate in character,"[29] rather than local. The Bureau of Public Roads, which was also created by this act, provided states with technical assistance, guidance, and political cooperation.[30] In 1938, the Bureau published a report in response to a request from President Franklin D. Roosevelt to evaluate the possibility of creating three east-west and three north-south toll roads across the country. This study, titled *Toll Roads and Free Roads*, concluded that such a system of toll roads would not be economically feasible. The report recommended instead that over 25,000 miles of low-cost non-toll roads be built to connect the downtown of each of the country's major cities, marking a shift in emphasis from rural highway construction to urban.[31]

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[28] Dennis W. Johnson, *The Laws That Shaped America: Fifteen Acts of Congress and their Lasting Impact* (New York and London: Routledge, 2009), 267. The federal government instituted its own tax on gasoline in 1932; however, this money went into a general revenue fund rather than a fund dedicated to highway maintenance and construction.

[29] Johnson, *Laws That Shaped America*, 268.

[30] The Bureau functioned as a central agency to coordinate state programs that varied widely in revenue. Due to the fact that each state had to provide 50% of the funds for any highway construction project, a state's ability to construct roads was dependent upon its tax base and spending power. Johnson, *Laws That Shaped America*, 268-269.

[31] Johnson, *Laws That Shaped America*, 268-269.

Nevertheless, states began to form private toll road commissions, which were responsible for building and maintaining high-speed toll roads and had the authority to issue statewide bonds as a means of financing. The first of many statewide toll highways in fact opened in Pennsylvania in 1940, benefitting in part from work-relief funding from the Public Works Administration of Roosevelt's New Deal.[32]

By the middle of the twentieth century, admiration abounded for many of the earliest landscaped parkways, from the Bronx River Parkway in New York (1923) to the Merritt Parkway in Connecticut (1940). The attention of American highway designers was captured at the same time by the high-speed straightaways and banked curves of the controlled-access *Autobahnen* being constructed under Adolf Hitler in Germany in the 1930s.[33] Historian Louis Ward Kemp has noted that the first highway engineers of the early twentieth century, recruited from city public works or the railroad industry, formed an institutional structure that conveyed a sense of unbiased and scientific expertise that favored their role in the development of new roads and highways.[34] Highway engineers created their own subcommittee of the National Research Council, called the Highway Research Board (hereafter HRB) that was the centralized authority on all technical highway issues. By the mid-1930s, engineers had developed many of the standard features of the modern highway, including limited access ramps, divided lanes, and long curves to enable safer driving at high speeds. Decisions on roadway design and

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[32] Johnson, *Laws That Shaped America*, 270.

[33] W. A. Bugge and W. Brewster Snow, "The Complete Highway," in *The Highway and the Landscape*, ed. W. Brewster Snow, 3-32 (New Brunswick, NJ: Rutgers University Press, 1959) 21-22.

[34] Louis Ward Kemp, "Aesthetes and Engineers: The Occupational Ideology of Highway Design," *Technology and Culture* 27 no. 4 (October 1986): 760.

alignment were based primarily on safety research that analyzed the relationship between roadway features and driver behavior. Roadway location was determined by engineering techniques that combined Origin and Destination (O&D) population surveys with mathematical and statistical traffic analyses. These latter techniques sought, for example, to account for the effect of railroad intersections and crossings as well as increased activity around industrial landmarks such as railroad terminals, factories, and markets.[35]

These engineers, rather than city planners or landscape architects, were responsible for designing the majority of the highways built in America in the 1940s and 50s and contributed to state and federal highway bureaucracies as well as private industry.[36] Despite the hegemony of engineers in the realm of highway design and construction, planners became involved in a limited fashion in the late 1940s through contributions in land-use planning and the development of traffic models and design theory.[37] Land-use considerations in the location of urban routes was considered as early as 1944 and significant research was undertaken on the topic over the following years by multidisciplinary groups of planners, economists, and engineers.[38]

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[35] See Kemp, 764-773, for detailed descriptions on O&D surveys, statistical modeling, and operational/safety research on driver behavior. For more on statistical traffic analyses, see Kemp, 769 and 779.

[36] Kemp argues that planners, in contrast to engineers, had not made any permanent ties to federal agencies during this same period of time. Kemp, 761.

[37] Kemp, 778.

[38] *Urban Traffic: A Function of Land Use* was prepared at the University of Pennsylvania in 1954 while the Detroit Metropolitan Area Traffic Study was completed in 1956, both of which used various mathematical and statistical models to compute correlations between traffic location and urban land use. See Kemp, 779-782 for more information on land-use planning. See also Robert Mitchell and Chester Rapkin, *Urban Traffic: A Function of Land Use* (New York, 1954), cited on page 779 of Kemp; and J. Douglas Carroll, study director, *Report on the Detroit Metropolitan Area Traffic Study*, 2 vols. (Lansing, 1953-56), cited on page 781 of Kemp.

During World War II, car production in America had ceased as the nation's industries were turned over to the manufacturing of wartime essentials. After the war, car production resumed at a much higher rate in response to increased demand. In addition to cars, the public also insisted upon high-speed, multi-lane, limited access highways.[39] The Federal-Aid Highway Act of 1944 was created in response to these demands, designating a national system of interstate highways that was split into primary, secondary, and urban arterial roads (the so-called ABC system). Unfortunately, the act did not provide for enough money to actually create such a system, due in part to the difficulties involved in determining a solvent federal formula for highway construction funding. A 1949 audit of US Highways, however, found that 37,000 miles of the country's highways were in bad states of repair and were of inconsistent width and pavement type. The audit similarly found that bridges along the highways had varying load capacities, making regular interstate travel challenging if not impossible for large vehicles such as tractor trailers.[40]

At the same time that the federal government was producing legislation on highway construction in the 1940s, it was also creating a series of Housing Acts that grew from Roosevelt's New Deal policies of the 1930s. These Acts simultaneously sought to stimulate the economy through housing construction and improve substandard housing conditions in many of the nation's cities.[41] By the end of the 1940s, substandard housing

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[39] Johnson, *Laws That Shaped America*, 272.

[40] Johnson, *Laws That Shaped America*, 271.

[41] Roosevelt's New Deal policies of the 1930s functioned as antecedents of the federal urban renewal program of the 1950s. Several surveys undertaken in cities across the country in the mid-1930s suggested that areas of depressed or deteriorated urban land – called slums – were not only a social ill, but were also an economic drain on urban and national economy. Jeanne R. Lowe, *Cities in a Race with Time* (New

stock had increased despite the Housing Acts of the 1930s and the nation's housing crisis had worsened. The Housing Act of 1949 attempted to set forth a national housing policy to eliminate substandard housing and eradicate slums and blighted areas.[42] Title I of the 1949 Housing Act was conceived as an extension of earlier housing acts and reinforced

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York: Random House, 1967) 24-25. The Housing Division of the Public Works Administration was created in 1934 as part of a larger government-sponsored initiative to clear these slums and construct low-rent public housing in its place. Jewel Bellush and Murray Hausknecht, eds, *Urban Renewal: People, Politics and Planning* (Garden City, N.Y.: Anchor Books, 1967) 6. It was endowed with the power to lend money to public agencies engaged in slum clearance and construction of low-rent housing but was also authorized to wield the power of eminent domain to condemn and redevelop land itself. Through this program, designated slum land in over thirty cities was cleared and replaced by fifty low-rent developments (Bellush and Hausknecht, 6-7). Although a Federal court declared in 1935 that housing was not public enough of a use to justify federal use of eminent domain, later court decisions upheld the local use of eminent domain with the reasoning that the eradication of slums was in the public's best interest (Lowe, 25-26). At the same time, the Federal Housing Administration was created under the National Housing Act of 1934 to provide mortgage insurance and low interest rates on loans for construction and repairs in order to stimulate the private housing industry. However, the FHA ultimately did little to improve housing stock in urban areas. The agency followed risk-averse lending practices that effectively "redlined" urban areas seen as depressed or deteriorating and refused to provide mortgage insurance in those areas. Lowe, 36; and Mel Scott, *American City Planning Since 1890* (Berkeley: University of California Press, 1969) 503. Thus, the elimination of "slums" and "blight" – both loose definitions relatively open to interpretation – was established as a priority early on and assumed an increasing importance over the decades to come. The risk-averse lending strategy of the FHA has been described as both racist and discriminatory against the lower classes. Redlining resulted in the refusal of mortgage insurance in blue-collar and lower-middle class neighborhoods and to low-cost houses and rental properties in general. This practice, which was continued through the early 1950s, prevented not only displaced slum dwellers, but also homeowners in such neighborhoods, who were often working class and ethnic minorities, from obtaining financing to either repair their homes or engage in new construction. Thus, the mortgage practices engaged by the FHA encouraged the deterioration of urban neighborhoods and did little to improve housing stock. The impossibility of obtaining mortgage insurance in deteriorating urban areas contributed to the migration of middle-class whites to the newly emerging suburbs, where mortgage insurance was easier to obtain and the city's problems could be left behind. Ethnic minorities, who were not allowed to purchase housing in white suburbs nor able to obtain mortgage insurance for loans for home repairs, were left in deteriorating urban areas without a way to significantly improve their physical environment. Bernard J. Frieden and Lynne B. Sagalyn, *Downtown, Inc.: How America Rebuilds Cities* (Cambridge, MA: MIT Press, 1991), 28-30 and 31-32. The Housing Act of 1937 established the United States Housing Authority to provide housing for those economically unable to find a decent home in the private market. Notably, the act asserted that the eradication of slums was a national goal and effectively tied its housing policy to the goal of slum clearance. It provided federal funding to cities, in the form of grants or low-interest loans, for up to 90% of the capital cost of clearing a slum and constructing low-income housing in its place. As such, it began to privilege the techniques of large-scale clearance of slums through eminent domain, and the attendant ground-up planning it necessitated (Bellush and Hausknecht, 9 and Lowe, 26-27). This practice resulted in the dislocation of numerous city dwellers – many of whom were minorities and lower classes – but failed to relocate them in affordable housing, resulting in displaced tenants who were left in conditions worse than they had been in before. Bellush and Hausknecht, 10 and Frieden and Sagalyn, 28-37.

[42] Scott, 464.

the long-established view that the slum problem could only be addressed through large-scale operations of clearance, re-planning, and private redevelopment and rolled its housing provisions into an ambitious program of urban redevelopment.[43] In practice, Title I was simply a continuation of the previous act's failures to accelerate slum clearance: between 1934 and 1954, from the year of the country's first housing legislation through the last year of Title I's hegemony, only 7% of the nation's substandard housing stock was eliminated. However, the approved techniques of large-scale clearance and redevelopment were nonetheless established as precedents for the massive highway construction program that would take off in the late 1950s and 1960s.[44]

The Local Scene: Highway Construction and Urban Renewal in Boston

In Boston, plans to build major highways through the city and under the harbor had been proposed as early as 1930. In 1927, the official planning arm of the city, the Boston Planning Board, undertook an extensive survey of city traffic and published its

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[43] Lowe, 31. For the Housing Act of 1949, two important constituencies came together: the downtown business interests, who sought help involving the private sector in rebuilding the deteriorating areas of downtown, and the housing reformers, who wanted better low-income housing for residents of slums. Frieden and Sagalyn, 22-23. Land acquired for redevelopment under Title I could be used for a wide variety of purposes, from luxury or low-income housing to public parks or commercial and industrial uses, as long as either the original or post-development use was predominantly residential. Title I subsidized the acquisition of slum land for redevelopment in the form of a federal grant to cities that covered 2/3 of the write-down cost of redevelopment. The write-down cost of land purchase was the difference between what the city paid for the land and what it received when it was sold to a private developer. The city paid the remaining 1/3 in the form of public works, services & land contributions. Bellush and Hausknecht, 12. Thus, the federal government subsidized the cost of slum clearance, regardless of whether the final use was residential, based on the continued assumption that slum clearance was in and of itself a social benefit. However, the mortgage lending rules of the FHA still essentially followed the redlining procedures of the previous decade. Therefore, even Title I failed to make slum land attractive to private developers, who were unable to obtain mortgage insurance for urban projects in slum areas. Bellush and Hausknecht, 12; Frieden and Sagalyn, 23.

[44] Bellush and Hausknecht, 14. See also Frieden and Sagalyn, 51-52, for statistics in several cities showing disproportionately large number of low-income housing units destroyed for every one that was ultimately built.

Report on a Thoroughfare Plan for Boston in 1930. The Board recommended the construction of ten major and more than fifty minor transportation projects, including a six-lane Central Artery with an "upper-level roadway" cutting through the center of Boston, as well as a harbor tunnel connecting the city to the airport, to ease the flow of traffic through the city from the North and South Shores.[45]

For various reasons, including financial distress and lack of political cooperation between city and state, the plan was not immediately implemented.[46] After World War II, however, the state became increasingly interested in repairing its deteriorating roadways and constructing a statewide highway network.[47] As part of its network, the highway system surrounding the state's largest city received particularly close attention. In 1947, Governor Bradford organized a Joint Board to prepare a metropolitan highway plan for Boston.[48] The plan, prepared by the engineering firm of Charles A. Maguire and Associates, was submitted in 1948 under the title *Master Highway Plan for the Boston Metropolitan Area*. (fig. 1.1) This *Master Highway Plan* called for a circumferential Inner Belt circling downtown and eight radial expressways feeding into the belt from all directions. (fig. 1.2) The expressways were given names such as "Northern," "Northeast," and "Southeast," depending on their cardinal direction, and were all limited access, multi-lane, and intended to facilitate access to and around Boston. (fig. 1.3) While many

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[45] Thomas O'Connor, *Building a New Boston: Politics and Urban Renewal 1950-1970* (Boston: Northeastern University Press, 1993), 82-83.

[46] O'Connor, 83.

[47] O'Connor, 80.

[48] Letter, Joint Board for the Metropolitan Master Highway Plan to Honorable Robert F. Bradford, Governor of the Commonwealth of Massachusetts, 1 February 1948, iii. Submitted to the Governor as a preface to the following report: Charles A. Maguire and Associates, *The Master Highway Plan for the Boston Metropolitan Area* (Boston: Joint Board for the Metropolitan Highway Plan, 1948)

portions of these highways would have to be constructed, others would follow existing roads that would be modernized, graded, and widened to accommodate increased speed and capacity.[49] These radials would connect on their outer edges to another ongoing and related Massachusetts state construction project: the modernization, construction, and improvement of Route 128, which when completed would be an 80-mile suburban belt route that enclosed the outer perimeter of the Boston Metropolitan Area. The connection provided by the radials between Route 128 and the Inner Belt around downtown Boston would create a comprehensive highway network for the entire metropolitan area.[50] The approach taken in the Maguire plan, consisting of an inner belt, outer belt, and radial expressways, was later established by the U.S. Bureau of Public Roads as a typical approach to metropolitan planning in 1955, reflecting the conventional wisdom at the time that belts and radials provided the easiest access into and around downtown for all big cities.[51]

A portion of the Inner Belt known as the Central Artery had the most immediate ramifications for Boston's downtown area.[52] This stretch of road, which cut through Boston's Central Business District (CBD) and separated the North End from the rest of the city, functioned as the easternmost chord of the Inner Belt. From the southern tip of the Artery, the Belt was designed to circle through Roxbury, the Fenway, Brookline,

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[49] Charles A. Maguire and Associates, *The Master Highway Plan for the Boston Metropolitan Area* (Boston: Joint Board for the Metropolitan Highway Plan, 1948), 51-60.

[50] Maguire, 62-63.

[51] Frieden and Sagalyn, 21.

[52] Maguire, 60-62. The exact route taken by the Central Artery as well as the proposed route for the remainder of the Inner Belt, which was never constructed, are topics that will be addressed in some detail in chapter 2.

Cambridge, Somerville, and Charlestown before re-connecting to the northern end of the Central Artery. (fig. 1.4) The Artery was prioritized for Stage 1 construction in the 1948 plan,[53] (fig. 1.5) but although contracts were awarded in the middle of 1951 and completion was targeted for the end of 1953, the elevated Central Artery did not officially open to traffic until 1959, due to various logistical and legal difficulties stemming from the construction of a multi-lane expressway through Boston's dense downtown area.[54] During the same time, between 1952 and 1957, the Massachusetts Turnpike was also constructed and significant debate ensued on how it would connect to the Inner Belt. The 123-mile, east-west, limited-access toll highway provided drivers with a way to easily traverse the length of the state and was another key completed element in the rapidly growing statewide highway network.[55]

Boston's physical landscape was transformed during this time not just by highways but also through the construction of high-revenue capital projects that benefited the tax base and livelihood of the central business district but destroyed historic neighborhoods and displaced the underprivileged. Boston's first project in the South End razed a low-income minority neighborhood for development into an area of light industry, although the site lay vacant for years before it was redeveloped.[56] A much

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[53] Maguire, 105-106 and map on 107.

[54] O'Connor, 83, 119. Although the residents of Boston's North End, who were cut off from the rest of the city by the Central Artery, had protested against the highway as early as 1950, their opposition was neither organized nor early enough to halt the proposed and preferred route of the highway through the city. O'Connor, 84-86.

[55] The Massachusetts Turnpike Authority was created in 1952, bonds were approved in 1954, and the turnpike opened only three years later, in 1957. O'Connor, 81-82.

[56] Brenda Bushouse, "Changes in Mitigation: Comparing Boston's Big Dig and 1950s Urban Renewal," *Public Works Management and Policy* 7 no. 1 (July 2002), 54.

larger undertaking, the redevelopment of 46 acres in the West End populated by working class Italians and Jews, began in 1951. (fig. 1.6) Following initial studies, early redevelopment plans were released in 1953 that included low-rent housing for almost 1200 families, as well as 200 middle-income and 640 high-rent apartments.[57] Those displaced were promised top priority in relocation to low-rent public housing. The provisions of the newly approved Housing Act of 1954 privileged techniques of spot clearance and rehabilitation, particularly in deteriorating but still livable neighborhoods, as well as a program of slum prevention as opposed to large-scale slum clearance;[58] however, the majority of projects across the country continued to follow the same procedures of sweeping clearance, displacement of slum residents without relocation assistance or payments, and construction of high revenue residential and commercial projects.[59] Indeed, by the time the official eviction notices for the West End were served in 1958, not only had the offer of relocation into public housing disappeared, but all the low-rent housing had also been eliminated from the redevelopment plans.[60] By 1960, the buildings were demolished and the entire site razed (fig. 1.7) in order to erect luxury

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[57] O'Connor, 126.

[58] Lowe, 35 and Scott, 502.

[59] Frieden and Sagalyn, 28-33. The Housing Act of 1954 was the first to stimulate private involvement in urban redevelopment, largely through an easing of the risk-averse mortgage restrictions established under the FHA in the 1930s. The act authorized the FHA to grant mortgages of up to 90% of construction cost, with redevelopment projects insured on the value of the completed redevelopment. The act also expanded the parameters of the mortgage insurance program, making it available to owners of both rental properties and houses in deteriorating neighborhoods. Scott, 503. There was a concurrent significant shift in the Housing Act of 1954 away from housing and towards renewal and urban redevelopment: while the previous acts required that funding go to projects that were predominantly residential in either origin or final product, this act allowed for up to 10% of funding to be used for entirely non-residential projects. This number was increased to 30% in the Housing Act of 1961, effectively allowing cities to rid themselves of commercial and industrial blight and capitalize on high revenue nonresidential projects at the same time. Bellush and Hausknecht, 15.

[60] O'Connor, 132-133.

townhouses and high-rise apartment buildings, all firmly priced in the middle- to high-income range.[61] The destruction of this tightly knit working-class neighborhood was studied in detail by Herbert Gans in the 1950s and later published in his landmark book of 1962, *The Urban Villagers*.[62]

The Boston Housing Authority, the local city agency that developed the West End project, had been created in 1949 to administer all federal programs.[63] Armed with the power of eminent domain, the BHA could strategically select and designate residential areas as blighted, purchase slum property for commercial or industrial redevelopment, and sell the land to a private developer at fair market rate. In 1950, the Housing Authority designated 2700 acres of city land for slum clearance and redevelopment.[64] Between 1952 and 1954, the BHA erected several housing projects in areas such as Brighton, the South End, Jamaica Plain, and Dorchester. Although they were considered successful at the time, the projects were racially and socially segregated and later seen as disastrous and sterile approaches to housing.[65] Other Boston projects included the

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[61] O'Connor, 133, 137.

[62] This book, which questioned the city's decision to completely raze a functioning, albeit poor, neighborhood and leave the displaced to fend for themselves, offers a compelling account of the immense physical, psychological, and social toll taken on the displaced victims of mid-century urban renewal. See Herbert Gans in *The Urban Villagers: group and class in the life of Italian-Americans* (New York: The Free Press of Glencoe, 1962), as well as O'Connor, 128-129.

[63] The Boston Housing Authority was replaced by the Boston Redevelopment Authority in 1957, in response to criticisms that the former was not appropriately handling the West End project. O'Connor, 127.

[64] O'Connor, 75-76.

[65] O'Connor, 123-124. An extreme example of this type of housing can be found in Pruitt-Igoe, a high-rise housing project built from 1951-1956 in St. Louis, Missouri. It was initially hailed for its breakthrough design but was eventually demolished due to its complete failure to provide safe and sanitary housing for its residents. William J. R. Curtis, *Modern Architecture Since 1900* (London and New York: Phaidon Press, 1982) 449. See also Oscar Newman, *Defensible Space: Crime Prevention Through Urban Design* (New York: Macmillan, 1973) 56-59 and 107-108.

construction of Government Center, a project planned for the heart of Boston's Scollay Square in 1957 that included a federal building, state office building, and new city hall, as well as the 52-story Prudential Tower on 28 acres of railroad land in Back Bay in the 1960s.[66] (figs. 1.8-1.9) Between 1950 and 1970, Boston became a locus for state and local efforts to build high-income housing to bolster the tax base, designate and clear "slum" land for reuse by more lucrative enterprise, and tie the city into a growing national network of high speed, limited-access highways.[67]

Visual Urban Form at MIT and The Perceptual Form of the City

In the early 1950s, just as the city of Boston was in the planning stages of multiple urban and highway construction projects, Kevin Lynch and fellow professor Gyorgy Kepes began to study the visual form of the city. This Perceptual Form of the City Study (hereafter PFoC Study) was organized under the auspices of the newly formed Center for Urban and Regional Studies at MIT's School of Architecture and Planning.[68] The research for the study began in a preliminary way in 1951, notably the year in which initial studies were prepared for the redevelopment of Boston's West End, and the study itself officially spanned the years between 1954 and 1959, during which time the Central

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[66] O'Connor, 141-142, 213, 289.

[67] A limited access highway can only be accessed through proscribed entry and exit ramps.

[68] In *The Image of the City*, Lynch writes that the study was carried out at The Center for Urban and Regional Studies at MIT. A memo written by Lawrence Anderson, Chair of the School of Architecture, noted that the school was urgently working toward creating such a Center in 1953, suggesting that the Center was opened just in time for the Perceptual Form of the City Study. See Kevin Lynch, *The Image of the City* (Cambridge, MA: MIT Press, 1960), v; and L. B. Anderson, "Humane Values in Modern Structure," 13 May 1953, Kevin Lynch Papers, MC 208, PFoC box 1, folder "Early Steps," Massachusetts Institute of Technology Institute Archives and Special Collections, Cambridge, MA (hereafter Lynch MSS).

Artery was constructed and the West End razed. Thus, at a time when large-scale urban transformation was becoming a reality, thanks to federal funding and the increased attention to urban redevelopment, Lynch and Kepes undertook what was to become a major research project on exploring how a city's form was perceived, structured, and understood by its inhabitants.

Both principals had joined the faculty at MIT's School of Architecture the previous decade: Kepes as Professor of Visual Design in 1946 and Lynch as Assistant Professor of City Planning in 1947.[69] They believed that the visual effects of city form were undervalued in the contemporary discussion on city planning and design and in 1951 proposed "a study on the visual form of cities," that would "deal with the physical form of the urban environment, particularly those aspects which are significant for their visual impact on the observer."[70] The concept for Visual Form of the City, still in preliminary stages, evinced an early interest in the role of movement in the structuring of urban vision. Included in a list of questions Lynch and Kepes proposed to address were the following: "How do visual impressions vary depending on speed and manner of observer approach and motion? Under various conditions of traffic, activity, weather, etc.?"[71] Although movement at the speed of the highway was not singled out in this proposal, the groundwork for a study on the relationship between visual perception and speed of movement is apparent from the earliest of stages.

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[69] Lynch received his B.S. in City Planning from MIT in 1946, after which he worked in North Carolina for a year before being invited back to join the faculty. See Banerjee and Southworth, *City Sense*, 19. For more on Kepes, see Douglas M. Davis, "Art & Technology – Conversations, Gyorgy Kepes: Searcher in the New Landscape," *Art in America* 56 no. 1 (January-February 1968): 38

[70] Kevin Lynch, "A study on the visual form of cities," April, 1951, Kevin Lynch Papers, MC 208, PFoC box 1, folder "Early Steps," Lynch MSS, 1.

[71] Lynch, "visual form of cities," Lynch MSS, 3.

In an experimental weekly seminar on the "visual form of the city," led by Lynch and Kepes in the fall of 1951, questions of form perception, city structure and order, visual unity and scale were discussed.[72] Perhaps most importantly, the seminar also considered the connection between movement and perception. Edmund Bacon, the director of the Philadelphia Planning Commission, was invited to present a talk "on perception of space, mass and time, as a frame of reference for urban design" during which he discussed the ways in which the movement of the individual through the urban fabric could be considered part of the larger process of the perception of space.[73] The examples selected by Bacon, such as walking through the city of Peking and traveling along the Nile River, explored the perceptual ramifications of movement in the landscape and broadened the framework for the seminar in which the role of movement in design was questioned. Indeed, the seminar's bibliography included works by figures such as Camillo Sitte, Gordon Cullen, and Ernö Goldfinger, all of who explored the role of movement in the urban spatial experience.[74] Lynch himself was well aware of the publications, visual techniques, and influence of both Sitte and Cullen early in his tenure

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[72] Kevin Lynch, "Esthetic Form of the City: Suggested Discussion Topics, 26 September 1951," Kevin Lynch Papers, MC 208, unprocessed box 3, folder "Urban Landscape: Lynch Class Notes, Etc. (1 of 2)," Lynch MSS.

[73] Kevin Lynch, "Brief Summary of Sessions - Experimental Seminar in the Visual Form of the City," Fall 1951, Kevin Lynch Papers, MC 208, unprocessed box 3, folder "Urban Landscape: Lynch Class Notes, Etc. (1 of 2)," Lynch MSS, 5-6.

[74] Although the seminar's bibliography did not yet consider any of the scientific research in perception, its inclusion of Sitte, Cullen, and Goldfinger reflected an early interest in the connection between spatial effect and urban design. Kevin Lynch, "Some References on the Visual Form of the City," September 1951, Kevin Lynch Papers, MC 208, unprocessed box 3, folder "Urban Landscape: Lynch Class Notes, Etc. (1 of 2)," Lynch MSS.

at the Massachusetts Institute of Technology, as both of their works appear on various of Lynch's bibliographies between 1950 and 1951.[75]

There had been a growing concern in architecture and planning with understanding the effect of speed on urban perception. As Ernö Goldfinger, noted Hungarian architect, wrote in 1941: "In the perception of space… a new element has appeared: high speed. We have seen that spatial perception is kinetic, therefore the speed at which a person subjected to a spatial order moves through it, is of first-rate importance."[76] He went on, noting however "no account has been taken of the potentialities and spatial exigencies of the eight to twenty-fold increased speed."[77] In 1950, Princeton Professor and Architect Jean Labatut summarized the results of a symposium on "Highways in Our National Life," noting the remarkable influence and potential of the emerging high-speed roadway. He wrote: "As the fragments of successful motorways increase in number, a consciousness of a new approach in landscape treatment and building design along the motorways will develop. At present, most of the buildings along the highway are located, oriented, and designed, as if the speed limit were that of a galloping horse. Very few studies have been made of architectural compositions along and for the motorway, and designed for actual

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[75] Sitte's text appears in the bibliography of one of Lynch's earliest syllabi from 1950 (see Kevin Lynch, Reading List, 4.681 Second Term, City and Regional Planning Department, Summer 1950, in Kevin Lynch Papers, MC 208, unprocessed box 2, folder "Course Materials," Lynch MSS). Several of Cullen's articles in *Architectural Review* from 1948-1950 appear in one of Lynch's earliest bibliographies of 1951 for his research on the Visual Form of the City (see Lynch, "Some References on the Visual Form of the City," September 1951, Lynch MSS). Cullen's *Townscape* of 1960 also appears in one of Lynch's Course Outlines from 1964 (see Kevin Lynch, Outline of Sessions, 4.571 The Urban Landscape, Fall 1964, Department of City and Regional Planning, Kevin Lynch Papers, MC 208, unprocessed box 3, folder "Urban Landscape: Lynch Class Notes, Etc. (2 of 2)," Lynch MSS.)

[76] Erno Goldfinger, "Urbanism and Spatial Order," *The Architectural Review* 90 (December 1941): 166.

[77] Goldfinger, "Urbanism," 166.

conditions of speed and visibility."[78] In 1953, architect Louis Kahn published an article in *Perspecta* in which he offered a new circulation pattern for Center City Philadelphia that was based on a functional division vehicles based on speed of movement. In this article, titled "Toward a Plan for Midtown Philadelphia," Kahn proposed to "re-define the use of streets and separate one type of movement from another so that cars, buses, trolleys, trucks and pedestrians will move and stop more freely, and not get in each other's way."[79] His article was complete with color-coded diagrams indicating a hierarchy of streets based on usage, from "through streets" intended for high speed movement from one end of the city to the other, notably located along the city's edges and harbors, to "go streets" for local access free of frequently-stopping public transportation, "stop streets" for vehicles requiring frequent stops, and pedestrian ways free of cars.[80] (figs. 1.10-1.11)

Lawrence Halprin and Design for Movement

At the same time that Lynch and Kepes were beginning their early studies on visual perception and movement through the urban fabric, on the other side of the country Lawrence Halprin was publishing articles exploring the potential of designing the

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[78] Jean Labatut and Wheaton J. Lane, eds., *Highways in Our National Life: A Symposium* (Princeton: Princeton University Press, 1950), 474. Labatut also noted the necessity for nighttime illumination on highways, "harmonizing with the environment of the motorway and not conflicting with safety as if often the case today." *Highways Symposium*, 474. For more on highway illumination, refer to chapter 4 and the MIT study of Boston's Central Artery.

[79] Louis I. Kahn, "Toward a Plan for Midtown Philadelphia," *Perspecta* 2 (1953): 11.

[80] Kahn, "Toward a Plan," 12. It has been noted that Lynch sent Kahn an early draft of his manuscript for *The Image of the City*, which Kahn carefully edited an annotated, and furthermore that Lynch's notes on the various city elements later influenced Kahn's work. See Sarah Ksiazek, "Architectural Culture in the Fifties: Louis Kahn and the National Assembly Complex in Dhaka," *Journal of the Society of Architectural Historians* 52 (December 1993): 418-419.

landscape from the moving viewpoint of the pedestrian. Halprin had, in fact, already completed his education long before Kepes and Lynch had even arrived in the Boston area. Halprin had begun his career not as a landscape architect, but as a horticulturalist: he received a B.S. in plant sciences from Cornell University in 1939 and an M.S. in horticulture from the University of Wisconsin, Madison in 1941. While in Wisconsin, Halprin married Ann Schumann, a fellow student who was studying dance, and they began a lifelong collaborative and creative endeavor to join dance and landscape design. Halprin made the decision to apply to Harvard University's newly-created Graduate School of Design (GSD) for landscape architecture after reading *Gardens in the Modern Landscape*, a book written by Harvard Professor Christopher Tunnard in 1938.[81] Halprin entered Harvard in 1942 on scholarship and had the opportunity to study with professors such as Walter Gropius and Marcel Breuer, as the atmosphere of the GSD allowed Halprin to come into contact with professors in departments other than landscape architecture. Halprin also noted being influenced by Laszlo Moholy-Nagy, who had founded The New Bauhaus (later the Institute of Design) in Chicago in 1937-38, and who lectured frequently at Harvard.[82] While they were in Cambridge, both Halprin and Ann became familiar with the Bauhaus philosophy of design being promoted there by Walter Gropius, particularly his focus on the workshop and his emphasis on developing

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[81] See Christopher Tunnard, *Gardens in the Modern Landscape* (Westminster: The Architectural Press, 1938). It is interesting to note that Tunnard would later co-author *Man-Made America* with Boris Pushakarev in 1963 (see Chapter 3).

[82] KQED, Inc., *Lawrence and Ann Halprin: Inner Landscapes*, VHS (San Francisco, CA: KQED, Inc., 1991).

knowledge of space by learning from all the arts, theater and music included.[83] As such, the interdisciplinarity of Halprin and Ann's endeavors was encouraged at an early phase in their relationship. This was furthered by Ann's connections in the avant-garde music and dance scene of the time. Ann first met John Cage in the late 1940s at an annual YMCA Young Choreographers Concert in New York, where she performed one of her avant-garde works, attracted his attention, and was introduced through him to dancer and choreographer Merce Cunningham.

Halprin finished his studies at Harvard early, in December of 1943, so that he could enlist in the navy. His B.L.A. was conferred in May of 1944; he was able to graduate in two years as it was his second undergraduate degree.[84] He spent the following year and a half serving a tour of duty on a destroyer in the Pacific, returning to the States on survivor's leave in April of 1945 after his ship was attacked by a kamikaze plane.[85] After his recuperation, he moved to San Francisco to begin practice at the landscape architecture firm of Thomas D. Church.[86] In 1949, Church and Halprin co-

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[83] See "Ann Halprin, Interviewed by David Bernstein," in *The San Francisco Tape Music Center: 1960s Counterculture and the Avant-Garde*, ed. David Bernstein (Berkeley: University of California Press, 2008), 223 and "The Bauhaus and the Settlement House," in Libby Worth and Helen Poynor, *Ann Halprin* (London: Routledge, 2004), 49-53.

[84] "The Chronology," in *Lawrence Halprin: Changing Places*, ed. The San Francisco Museum of Modern Art, 114-149 (San Francisco: San Francisco Museum of Modern Art, 1986), 115; and KQED, *Inner Landscapes*.

[85] "The Chronology," 114-116. See also Chapter 2 for more on Halprin's educational background.

[86] An already well-established landscape architect, particularly in the Bay Area, Church designed gardens for over 1400 clients. Church's office also provided a starting point for many of the Bay Area's most well-known landscape architects (see Alison Hirsch, "Lawrence Halprin: The Choreography of Private Gardens," *Studies in the History of Gardens & Designed Landscapes* 27 no. 4 (2007): 260). Hirsch describes Church's approach as one that was characterized by the use of "formal devices such as simple planes, flowing lines, a multiplicity of viewpoints, with an emphasis on texture, color, space, and form." She notes further that Halprin's gardens of the 1950s bear resemblance to Church's signature style in the employment of flowing lines and an "equal, if not more heightened interest in texture, transition and perspective." Hirsch, "Choreography," 260, 261. For more on Church, see Dianne Harris, "Making Your Private World: Modern Landscape Architecture and *House Beautiful*, 1945-1965," in *The Architecture of*

authored an article in *House Beautiful*,[87] titled "You have a goldmine in your backyard" in which they wrote of simple devices that could be used to improve the average American backyard: "[The] secret of design success is to create lines that have movement and flow, which invite the eye to move out on one kind of flowing line and come back on another kind of moving line. Avoid static lines which cause the eye to come to a dead end in a right angle where two lines meet. Avoid symmetrical line-patterns. They are too obvious and they do not invite the eye to complete the circuit."[88] This article reflects Church's signature emphasis on creating a sense of visual movement through garden design.[89]

Halprin's first solo article, titled "The Choreography of Gardens," did not appear in an architecture or landscape architecture journal, but in a journal dedicated to dance, co-published by himself and his wife, dancer Ann Halprin.[90] In this article, published in

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Landscape, 1940-1960, ed. Marc Treib, 180-205 (Philadelphia: University of Pennsylvania Press, 2002) 202. See also Thomas Church, "Worth Looking At All Year," *House Beautiful* (January 1948): 105.

87 *House Beautiful* often featured Church's work (Harris, "Private World," 183).

88 Thomas Church and Lawrence Halprin, "You have a goldmine in your backyard," *House Beautiful* (January 1949): 44.

89 Designing for movement had a long tradition in landscape architecture that emerged from the practices of English landscape gardening in the seventeenth, eighteenth and nineteenth centuries. See John Dixon Hunt and Peter Willis, eds., *The Genius of the Place: The English Landscape Garden 1620-1820* (London: Paul Elek, 1975).

90 "The Chronology," 116 and KQED, *Inner Landscapes*. Called *Impulse*, the journal appeared in its first issue during the summer of 1948 and emerged from the work of a workshop group at Ann's Halprin-Lathrop dance studio in San Francisco. The workshop was "an intensive seven-week summer course in dance and related arts" and the pieces in the magazine's first issue were contributed by faculty, students, and members of the workshop. "Editor's Note," *Impulse*, San Francisco, CA (1949): 1, Folder "Impulse," call no. 014.I.B.2949, Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania, Philadelphia (Halprin Collection). Since their meeting at the University of Wisconsin, where Halprin was studying horticulture and she dance, they had entered into a collaborative and creative endeavor to join dance and landscape design. Indeed, his ideas on choreography were influenced fairly early on by Ann's work in the dance world. Over the course of their lives together, they developed a synergistic relationship that manifested in their many collaborative workshops, projects, and cross-curricular involvements. KQED, *Inner Landscapes*. For more on the influence of Ann and dance on Halprin's work, see Chapter 5.

1949, Halprin wrote of the connections between garden design and dance. Just as contemporary dance had broken with the stiffly formal "little tutu ballet skirt and the tip-toe flourishing of the little ballerinas"[91] of old, contemporary landscape design had to discard the traditions of the gardens of the past, "designed to be looked at from one vantage point… [which] produced a terribly static garden lacking in any real sense of participation."[92] (fig. 1.12) For Halprin, the static garden was an outgrowth of the imperial gaze of kings and courtiers and was no longer relevant for people today. Instead, gardens had to be designed dynamically, for both movement and a wide range of activities: "We are no longer content to sit stiffly in the garden in our best Sunday Clothes, protected from the sun by a frilled umbrella."[93] Halprin argued that this movement could be achieved through the patterning and flow of terraces and paths as well as through textural variation of paving, foliage, and fences. All of these elements, when related together rhythmically, could choreograph movement and evoke "the fine sense of a dance."[94] Halprin's ultimate aim was to increase the kinesthetic experience of the garden, a task that could be informed by the lessons of dance. A static garden inhibited movement and thereby limited the full range of sensation to be obtained through kinesthesia and the experience of the body within its surroundings. Dance activated the whole body and was based on kinesthetic experience: "By designing for constantly

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[91] Lawrence Halprin, "The Choreography of Gardens," *Impulse*, San Francisco, CA (1949): 31. Folder "Impulse," call no. 014.I.B.2949, Halprin Collection. Despite his interest in the connections between dance and landscape architecture, Halprin did not write about dance notation until much later. In fact, he did not publish his thoughts on Labanotation until 1965, when his article on "Motation" appeared in *Progressive Architecture*.

[92] Halprin, "Choreography of Gardens," *Impulse*, 31, Halprin Collection.

[93] Halprin, "Choreography of Gardens," *Impulse*, 32, Halprin Collection.

[94] Halprin, "Choreography of Gardens," *Impulse*, 33, Halprin Collection.

pleasant movement patterns, our lives can be given the continuous sense of dance."[95]

Philip Thiel at MIT and "An Urban Visual Redevelopment"

Between 1951 and 1952, while Lynch and Kepes were developing the preliminary ideas of their PFoC study and Halprin was beginning to design residential gardens, Philip Thiel began his own research on recording the sequential nature of experience in a senior project for his bachelor's degree in architecture at MIT.[96] Thiel initially arrived at MIT in 1949 not as a student, but as an instructor of naval architecture.[97] As Thiel himself wrote, "When Gyorgy Kepes, then teaching visual design in the architecture department at M.I.T. made me a TA offer I couldn't refuse, I changed my affiliation from teacher to student, went from ship to shore, and enrolled in architecture."[98] Thiel began taking courses to fulfill the requirements for a bachelor's degree in architecture at MIT in 1950 and was exposed to the work and ideas of professors such as Lawrence Anderson, Kevin Lynch and Robert Woods Kennedy, as well as Kepes.[99]

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[95] Halprin, "Choreography of Gardens," *Impulse*, 33-34, Halprin Collection. The connection Halprin made between dance and garden design was so strong that his article was reprinted, word-for-word, in *Dance Magazine* in 1953. Although the entire article was reproduced in Dance Magazine, it was condensed to fit on to a single page, whereas the original article in *Impulse* covered four separate pages. Lawrence Halprin, "The Choreography of Gardens," *Dance Magazine* (July 1953): 33.

[96] Philip Thiel, "A Sequence-Experience Notation for Architectural and Urban Spaces," *The Town Planning Review* 32 no. 1 (April 1961): 33.

[97] Thiel received his undergraduate education at the Webb Institute for Naval Architecture and Marine Engineering and graduated with a bachelor's of science degree in 1943. He began practicing naval architecture right way at a Boston firm that specialized in fishing vessel design. After receiving his master's of science degree from the University of Michigan in 1948, Thiel began teaching naval architecture at MIT. Philip Thiel, "To the Ipswich Station," *The Center for Wooden Boats 2006 Festival Shavings* 27 no. 4 (Summer 2006) 14.

[98] Philip Thiel, "Ham on Wry: A Personal View of Architectural Education" (lecture transcript, ACSA Annual Meeting, Seattle, WA, March, 1995), 1.

[99] Philip Thiel, interview by author, August 1-3, 2006, Seattle, WA.

Thiel's thesis, titled "An Urban Visual Redevelopment," involved the visual redevelopment of section of central Boston that began at the State House and extended east to the harbor. His thesis studied a strip of the city that included the Boston Common, King's Chapel, City Hall, Scollay Square, Adams Square, Faneuil Hall, Quincy Market, the Custom House Tower, the Central Artery, and Boston Harbor.[100] (fig. 1.13) Thiel's study was intentionally visual in nature and purposely ignored issues of functional re-planning and redevelopment, a somewhat naïve approach to urban design that reflects his early stage of research. He sought to stitch together the major landmarks of the city through the introduction of grade changes, pedestrian plazas, landscaping, spatial contrast and rhythm, color, and texture. By using such devices to control and lead both physical and visual movement through the cityscape, his method was more akin to "visual salvage, as distinguished from face-lifting. It is a demonstration of the discovery of visual potentialities, and their development from latency."[101] Thiel studied the city from the viewpoint of the pedestrian, conceptualizing Boston on one hand as a tourist tracing a path through the city in an attempt to see all its points of interest and on the other as a city resident seeking safe, automobile-free pedestrian areas for relaxation and circulation. Thiel attempted to envision the visual redevelopment of the city sequentially, via a historical path that would function to connect pedestrian islands and access areas.[102] In fact, the study had been initially suggested by Lawrence Anderson, the head of the architecture department at MIT, who was involved in the creation of a path through the

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[100] Philip Thiel, "An Urban Visual Redevelopment" (bachelor's thesis, Massachusetts Institute of Technology, 1952), 1-55. Institute Archives and Special Collections, MIT Libraries, Cambridge, MA.

[101] Thiel, "Urban Visual Redevelopment," 17.

[102] Thiel, "Urban Visual Redevelopment," 25.

city – later called the Freedom Trail – that was then being developed to pass points of historical and cultural interest.[103]

For Thiel, vision played a key role in giving structure and identity to the city: "[Vision] has a vital part to play, in reminding us of nature's order, in structuring our thinking, and integrating our faculties, and as an all-pervasive means of communication."[104] The notion of "regaining visual control over the landscape" functioned as a means of regaining control over city life and improving standards of living. Thiel criticized the state of the city, pointing to the loss of human scale and contact with nature as signs of the city's deterioration in America.[105] Thiel's study was guided by the goal of providing a more human environment, concretely through the reinforcement of separation of pedestrian and automobile and the creation of larger pedestrian realms and philosophically through the engagement of visual order. "Visually, the attempt has been to clarify amorphous areas and forms, revitalize symbols and functions, relate the 'bits of things' into a unity, and to provide a means of orientation by using the floorscape or some salient feature."[106]

In his bachelors thesis, Thiel developed principles of urban design as experienced in dynamic pedestrian perspective. His study of spatial expansion, compression, and attention was evident in his "Sequence Summary," a drawing included in his thesis that

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[103] Thiel, "Sequence-Experience Notation," 33; Thiel, Interview. Thiel notes in his thesis that at the time of his study, the Boston Park Department had already placed small directional signs leading pedestrians along a "freedom trail" that joined the many historical buildings of Central Boston, apparently at the urging of the custodian of the Old North Church. Thiel, "Urban Visual Redevelopment," 25.

[104] Thiel, "Urban Visual Redevelopment," 9.

[105] Thiel, "Urban Visual Redevelopment," 9, 7.

[106] Thiel, "Urban Visual Redevelopment," 27.

charted the visual spatial experience of the individual to the left and right along the route. (fig. 1.14) The centerline, corresponding with the observer's path of movement, was modified through gradual curves and sharp peaks. The journey past King's Chapel and City Hall, for example, showed a gradual swell on the right and two shallow peaks of interest to the left, while Scollay Square was indicated by a small peak to the left and the Custom House Tower by a large peak to the right. Thiel called this sequence summary his first example of a sequence notation in that it was "a sequence of spaces and their subjective representation."[107] As Thiel later noted in an article published in the journal *Town Planning Review*, it was in the course of his study of Boston that he became aware of the deficiencies that existed in the means of architectural representation, which he described as inadequate to convey or measure sequential spatial relationships and developments.[108] Submitted along with the thesis was a series of perspective sketches that depicted his recommendations for visual improvement along his chosen route. (fig. 1.15) These sketches, which combined views from pedestrian eye-level with birds-eye-views, illustrated how his suggested changes tied together larger sections of the path through the city's fabric.[109] Thiel's visual approach in his analysis of Boston, albeit a

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[107] Thiel, interview. The sequence summary was unfortunately unaccompanied in the thesis by any explanatory text or notes.

[108] Thiel, "Sequence-Experience Notation," 33; Thiel, interview.

[109] These drawings were not bound with the thesis on file at the Massachusetts Institute of Technology Institute Archives and Special Collections, but were given to the author by Thiel during an interview dating August 1-3, 2006. Some drawings are keyed to the text; others are unnumbered and show pedestrian views at street level. Thiel's bound thesis was also accompanied by several large fold-out drawings, including a contour map showing points of interest, a study of vehicular traffic densities along the streets included in his area of study, a color-coded study of land use, and a freehand concept map showing how the various points of interest conceptually relate. Also included were several black and white photographs and old postcards showing earlier, pre-automobile views of some of his points of interest, as well as multiple quotations excerpted from the work of Charles Dickens, Norman Mailer, Lewis Mumford, Gyorgy Kepes, Frederick Engels, and William Morris.

first step in his research, ignored all other aspects of urban design from function to finances and was thus anything but a valid planning document. However, this approach was indicative of a growing interest in the visual effects of urban design in motion that took off in the work of Lynch and Kepes at MIT over the following decade.

The Perceptual Form of the City and Intersections with Psychology

This interest in understanding the visual effect of movement, seen in Thiel's MIT work and evinced by some of the noted figures of the time, was both reflected in and reinforced by Lynch and Kepes's studies of movement and visual perception in the early 1950s.[110] In "Possible research in city form," a research proposal submitted for grant consideration to the Rockefeller Foundation in 1953, Lynch and Kepes proposed to study the "impressions of movement" in several case study cities, including the "stream of impressions, transitions, variations due to speed and manner of movement, [and] expression of time and space relation," and, moreover, the "visual effects designed for the observer in motion; organization of effects where movement is at two or more distinct speeds."[111] In this proposal, Lynch and Kepes also questioned the efficacy of the existing tools of urban design. They proposed to examine "the value of design tools (drawings,

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[110] Lynch received a grant from the Ford Foundation to spend a year in Europe in 1952-1953. Banerjee and Southworth, *City Sense*, 20. He spent a considerable amount of time in Florence, exploring the question of city form and developing series of questions related to how an individual perceives the city's structure and orients himself to its basic elements. Kevin Lynch, "Notes on City Satisfactions," in Banerjee and Southworth, *City Sense*, 135-153 and Letter, Kevin Lynch to Louis B. Wetmore, 17 May 1953, Kevin Lynch Papers, MC 208, unprocessed box 2, folder "City Design Research," Lynch MSS. The proposal was discussed with the Rockefeller foundation while Lynch was still in Europe but the study did not officially commence until Lynch returned to MIT to begin directing the project with Kepes. Letter, Louis B. Wetmore to Kevin Lynch, 11 May 1953, Kevin Lynch Papers, MC 208, PFoC box 1, folder "Early Steps," Lynch MSS.

[111] Kevin Lynch, "Possible research in city form," August 21, 1953, Kevin Lynch Papers, MC 208, PFoC box 1, folder "Early Steps," Lynch MSS.

models, etc.) in predicting the resulting urban form, and means of enhancing this value."[112] This proposal was accepted by the Rockefeller Foundation and funded for three years, from 1954-1957, which was the initial projected length of the study. The study was eventually extended for two more years, until 1959, albeit without additional funding from the Rockefeller Foundation.[113]

In a more thorough proposal on "The Perceptual Form of the City" written in 1954, which was disseminated to over forty colleagues and professionals for comment, the two principals provided a more thorough explanation of the need to develop alternative graphic techniques for the description and analysis of the urban experience.[114] They wrote:

> New tools and techniques are also required for use of the practicing architect or planner in conceiving and expressing his effects in urban design. Development of such methods for architectural design (plans, elevations, sections, perspectives, models) had a significant effect in unfolding the creative power of the architect in dealing with the single building. Such techniques are very imperfect on the community scale. A method of describing the sequence of spatial effects in a large area, for example, or a device for projecting the observer, at scale, into any given point in a model, would be techniques of this nature. Better tools would

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[112] Lynch, "Possible research," Lynch MSS, 3.

[113] Kevin Lynch, "Summary of Accomplishments: Research Project on the Perceptual Form of the City," April 1959, Kevin Lynch Papers, MC 208, PFoC box 1, folder "General Statements (2 of 2)," Lynch MSS, 1. For a description of the schedule for the initial three year study, see Kevin Lynch, "The Perceptual Form of the City Progress Report and Plan for Future Studies," June 1955, Kevin Lynch Papers, MC 208, PFoC box 1, folder "General Statements (1 of 2)," Lynch MSS, 1. Lynch also notes in *The Image of the City* that the project was funded by several years by the Rockefeller Foundation (see Preface to *The Image of the City*, v).

[114] Kevin Lynch and Gyorgy Kepes, "Proposed Study: The Perceptual Form of the City," 4 March 1954, Philip Thiel Manuscript Collection, Box F, Folder "[Kevin Lynch and Gyorgy Kepes, The Perceptual Form of the City]," Brown University Archives (hereafter Thiel MSS). Lynch notes that this proposal, which he called "the original research project," was "circulated to some forty professionals for comment," including the MIT psychologist J. C. R. Licklider. "Appendix A – Summary of Activity: September, 1954-March 1955," in Lynch, "Progress Report," June 1955, Kevin Lynch Papers, MC 208, PFoC box 1, folder "General Statements (1 of 2)," Lynch MSS, 26.

have immediate application in current design work, and could prevent many unintended effects.[115]

In this proposal, Lynch and Kepes acknowledged the deficiency of existing tools for visual urban design and, less than a year later, the two authors suggested that a completely new graphic technique was in order. In their "Framework for the Form of City Study and Some Topics of Study" of 1954, circulated to numerous designers and psychologists for comment, they proposed a set of studies on "graphic analogues and graphic analyses of city form."[116] Although no examples or illustrations of these graphic analogues were included with the proposal, Lynch and Kepes wrote that they would eventually be able to capture the sensations of spatial pattern, orientation, and sequence,[117] aspects that would later be targeted by the notation in *The View from the Road*.[118]

Some of the earliest proposals prepared by Kepes and Lynch reveal a notable interest in exploring the principles of psychology and spatial perception as they related to

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[115] Lynch and Kepes, "Proposed Study," Thiel MSS, 4.

[116] Kevin Lynch and Gyorgy Kepes, "A Framework for the Form of City Study and Some Topics for Study," 22 December 1954, Kevin Lynch Papers, MC 208, PFoC box 1, folder "Early Steps," Lynch MSS, 5. For Lynch's review of the process of preparing this Framework and of circulating it to others, see "Appendix A" of Lynch, "Progress Report," Lynch MSS, 26-27.

[117] Lynch and Kepes, "Framework," 5.

[118] Although the Space Motion and Orientation diagrams of *The View from the Road* were still several years away from being developed at this point, experimentation with tools of representation characterized the PFoC Study from its official inception in 1954. As part of the Study, the principals proposed to examine a small area in the city using multiple methods of environmental description, including photographic series, sequences and studies; models; and motion pictures. However, no new graphic notation was developed to capture visual sequence in this portion of the project. See Gyorgy Kepes, Report to Kevin Lynch, "Morphological Aspects of the City: Index to Inventory Material" 21 June 1956; Memo to Kevin Lynch from Gyorgy Kepes, "Morphological Aspect of the City," n.d. (c. 1956); and Bernard Spring, "Proposed Program for Filming of the Study Area and Proposal for the Use of Sound in Connection with the Film," 6 March 1956; all located in Kevin Lynch Papers, MC 208, PFoC box 1, folder "Small Area Study," Lynch MSS. The nature of the "small area study" is not relevant for *The View from the Road* but further information can be found in Lynch, "Progress Report," June 1955, Lynch MSS, 6-15.

the process of navigating through the city. In 1954, Lynch and Kepes distributed the first official statement of their research project to a number of colleagues and professionals, including the MIT psychologist, J. C. R. Licklider.[119] In his response to the proposal, Licklider wrote: "From a psychological point of view, [your plans] appear to take you into areas in which psychological techniques are by no means well worked out. This suggests that the existing methodology of psychology may not be of as much help to you as I wish it could be, but, on the other hand, it indicates that what you do will be of considerable psychological interest."[120] Lynch and Kepes insisted on foraying into the field of psychology despite their lack of any significant experience or education in the subject. In his response to Licklider, Lynch wrote that despite their lack of training, "we are still convinced of the psychological base to our studies, and mean to learn all we can about it, and perhaps to try some pilot studies," as well as "some miniature seminars on the subject for our benefit in the future."[121] In the "Framework for the Form of a City Study," which soon followed the Licklider correspondence in 1954, the authors questioned the nature of perception as experienced in sequence and over time in the city. Various factors influencing perception, including scale, rhythm, relationship of observer and object, speed, and organization of sensory information, were noted as worthy of study.[122] Although the process of perception was a lens through which the city could be studied, the authors were again careful to note that the basic disagreement in psychology

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[119] "Appendix A" in Lynch, "Progress Report," June 1955, Lynch MSS, 26.

[120] Letter, J. C. R. Licklider to Kevin Lynch, 13 September 1954, Kevin Lynch Papers, MC 208, PFoC box 1, folder "Comments on Original Proposal and General Framework," Lynch MSS, 1.

[121] Letter, Kevin Lynch to J. C. R. Licklider, 12 October 1954, Kevin Lynch Papers, MC 208, PFoC box 1, folder "Comments on Original Proposal and General Framework," Lynch MSS, 1.

[122] Lynch and Kepes, "Framework," Lynch MSS, 3.

over a central and accepted theory of visual perception could prove to be problematic, particularly as neither Lynch nor Kepes had any specialized training in psychology.[123]

Among those who were asked by Lynch and Kepes to comment on the "Framework for the Form of the City Study" of 1954 was experimental psychologist James J. Gibson.[124] In his letter of response to the proposal, Gibson noted that there was no single theory of perception that addressed all the issues suggested by Lynch and Kepes as worthy of study and noted the difficulties attendant to the "basic controversies over the psychology of perception."[125] He expressed considerable interest in their project, however, and asked for a relevant bibliography, noting that several of his students might be interested in learning more about the issues they discussed.[126] Lynch responded in kind, asking Gibson to recommend reading material of his own and expressing hope that, somehow, the two fields could be aligned.[127] Through this correspondence, however brief, Lynch and Gibson established a mutual interest in issues of urban spatial perception and in a search for a psychologically sound basis for the study of architectural and spatial form perception. Gibson's text of 1950, *The Perception of the Visual World*, (fig. 1.16)

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[123] Lynch and Kepes, "Framework,"Lynch MSS, 1.

[124] Kevin Lynch, "Recommended References on the Form of the City," February, 1955, Box F, Folder "[Kevin Lynch and Gyorgy Kepes, The Perceptual Form of the City]," Thiel MSS, 2; and Letter, James J. Gibson to Kevin Lynch, 23 February 1955, Kevin Lynch Papers, MC 208, PFoC box 1, folder "Comments on Original Proposal and General Framework," Lynch MSS, 1

[125] Letter, Gibson to Lynch, Lynch MSS, 1.

[126] Letter, Gibson to Lynch, Lynch MSS, 1.

[127] It is unclear whether there were any further exchanges between Lynch and Gibson, as no evidence of exchanged bibliographies or reading materials was found in the Lynch MSS. Letter, Kevin Lynch to James J. Gibson, 2 March 1955, Kevin Lynch Papers, MC 208, PFoC box 1, folder "Comments on Original Proposal and General Framework," Lynch MSS, 1.

appears in a bibliography on "Recommended References on the Form of the City," prepared by Lynch during this time in February of 1955.[128]

There are several fascinating conceptual parallels between the PFoC study and Gibson's research.[129] Indeed, over the course of the PFoC Study, many of Gibson's descriptive terms appeared in reports that summarized the methodologies and devices used in psychological studies of perception. In a report of 1956, a research assistant summarized the major concepts from Gibson's *The Perception of the Visual World*, including the texture gradient, retinal disparity, and motion perspective.[130] Similarly, Gibson's foundational distinction between the visual field and the visual world, a concept established early in *The Perception of the Visual World*, also appeared in a summary prepared for the PFoC Study on the "levels of organization in perception."[131] In none of these instances, however, was Gibson's research ever directly cited, making it impossible

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[128] Lynch, "Recommended References," February 1955, Thiel MSS, 2. Gibson's book was, moreover, the only scientific source to appear in the bibliography of *The View from the Road* itself in 1964. Appleyard, Lynch and Myer, *View from the Road*, 64. In fact, by the time *The View from the Road* was published, Gibson had contributed an article on pictorial representation to one of Kepes's books of 1960 and would contribute another in 1965 on perceiving the structures of the everyday visual world. See James J. Gibson, "Pictures, Perspective, and Perception," in *The Visual Arts Today*, ed. Gyorgy Kepes, 220-231 (Middletown, CT: Wesleyan University Press, 1960) and James J. Gibson, "Constancy and Invariance in Perception," in *The Nature and Art of Motion*, ed. Gyorgy Kepes, 60-70 (New York: George Braziller, 1965).

[129] The connections between Gibson and the PFoC Study appear most strongly in *The View from the Road*, particularly in relation to the definition of visual cues for vehicular locomotion and the perception of motion and self-motion through space (see Chapter 4 for more on *The View from the Road*). For the MIT authors description of the visual cues for motion and self-motion, see Donald Appleyard, Kevin Lynch and John Myer, *The View from the Road* (Cambridge, MA: MIT press, 1964), 8 and 11. Their descriptions of these cues bear marked similarity to Gibson's indicators for the visual control of locomotion through space, as noted in his article of 1958. See James J. Gibson, "Visually Controlled Locomotion and Visual Orientation in Animals," *The British Journal of Psychology* 49 (May 1958): 186-189.

[130] See Julian Beinart, "The Morphological Study of the City: An analysis of the perceptual devices, August, 1956," Kevin Lynch Papers, MC 208, PFoC box 1, folder "Small Area Study," Lynch MSS, 1-4. Beinart received his M.Arch from MIT in 1956 and was likely a research assistant on the project that summer, along with others such as Philip Thiel.

[131] See Kevin Lynch, Discussion in Progress: the Image of the Urban Environment, Kevin Lynch Papers, MC 208, PFoC box 1, folder "General Statements (1 of 2)," Lynch MSS, 1.

to determine the extent to which Gibson's theories were directly reviewed and implemented. Landscape architect and historian Hashim Sarkis has described Gibson as "a self-proclaimed radical realist… calling for a psychological practice that supported a reformed democracy in post-war social and political reconstruction. His political affinities and reformist work in psychology earned him the reputation of the distinguished dissident of perceptual psychology."[132] In particular, Gibson's support of his colleague, the psychologist Edward Tolman, in resisting the University of California's mandatory oath against communism in 1949, placed Gibson himself under federal suspicion for communist sympathies. Eventually, Tolman was stripped of his title and funding and Gibson was denied federal funding of his own. Sarkis has suggested that Lynch deliberately removed all references to Gibson's research in the PFoC Study due to fears over McCarthyism, noting that the presence of a federal agent at MIT monitoring the faculty's activities would have provided a strong incentive to remove references to Gibson's research.[133] Sarkis has uncovered many parallels between the work of Gibson and Lynch, calling particular attention to the congruence between Gibson's texture gradients, planes and surfaces and Lynch's study of the elements of city form[134] and noting that, "despite strong similarities both in approach and in terminology, Gibson remains absent from the work of Lynch."[135] Thus, while it is impossible to conclusively

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[132] Hashim Sarkis, "Disoriented: Kevin Lynch between Behavioral Psychology, Boston, and Planning," in *Publics and Architects: Re-Engaging Design in the Democracy* (PhD diss., Harvard University, 1995), 23.

[133] Sarkis also notes the absence of of Tolman's name from Lynch's bibliographies. In 1948, Tolman coined the term "cognitive mapping," which, as Sarkis demonstrates, provides the theoretical groundwork for Lynch's book of 1960, *The Image of the City*. See Sarkis, 26-27.

[134] This is particularly true in regard to Lynch's five elements of city design, published in *The Image of the City* in 1960 (see Chapter 2).

[135] Sarkis, 23-24.

determine the extent of crossover between Gibson's theory of visual perception and the visual approach to design taken in the PFoC Study, the MIT authors' exploration of Gibson's research is nonetheless interesting to note.

A psychological theory that was, on the other hand, rather openly explored over the course of the PFoC study was that of Gestalt Psychology. The connection to Gestalt theory can largely be attributed to Kepes, whose 1944 book, *The Language of Vision*, applied Gestalt principles of visual perception to create a system of visual organization for artists. The founding of Gestalt psychology is principally attributed to three German psychologists – Max Wertheimer, Wolfgang Köhler, and Kurt Koffka – working at the Psychological Institute at the University of Berlin in the early twentieth century.[136] The Gestalt psychologists asserted that the visual environment was structured through a process of field organization.[137] The key Gestalt principles of visual organization were based on the rules of regularity, symmetry, and simplicity.[138] The law of good continuation, for example, stated that organization tended toward complete and stable structures, or "good shapes" that were regular or symmetrical. The law of proximity and equality similarly affirmed that when a field contained a number of equal parts, the elements in greater proximity to one another would be organized into a higher unit. Through the law of closure, closed areas were more stable and readily perceived than

[136] Harry Heft, *Ecological Psychology in Context: James Gibson, Roger Barker, and the Legacy of William James's Radical Empiricism* (Mahwah, NJ: Lawrence Erlbaum Associates, 2001), 203-204.

[137] Kurt Koffka, *Principles of Gestalt Psychology* (New York: Harcourt, Brace & World, 1963 and 1935): 67-68.

[138] This was based on Wertheimer's Law of Prägnanz, defined by Koffka in the following manner: "Psychological organization will always be as 'good' as the prevailing conditions allow. In this definition the term 'good' is undefined. It embraces such properties as regularity, symmetry, simplicity and others." Koffka, *Principles*, 110.

unclosed areas. However, not all closed areas were equally good: the interaction between and total effect of all the tendencies together contributed to the perception of a closed shape.[139] The interrelationships between these laws led to one of the key and founding principles of Gestalt psychology, which was that the whole was not simply greater than the sum of its parts but that the whole was different from the sum of its parts. This law affirmed the meaningful nature of the part-to-whole relationship and the role of the Gestalt or organizational structure in the process of perception.[140]

The potential parallels between the Gestalt principles of visual organization and corresponding artistic principles in visual art were realized early in the twentieth century. The Gestalt psychologists, operating out of Berlin, were in relatively close proximity to the Bauhaus during the latter's tenure at Dessau. Gestalt psychologist Rudolf Arnheim, who later wrote series of books on the psychology of art,[141] visited the Bauhaus as early as 1927. Köhler himself was invited to give a lecture at the Bauhaus in 1929; although he could not accept the invitation, one of his students lectured in his place to an audience that included Bauhäusler Paul Klee, who had, in fact, been aware of Wertheimer's research as early as 1925. The following winter, Bauhaus professor Wassily Kandinsky and Josef Albers both attended a series of lectures on Gestalt theory.[142] Indeed, Kepes's engagement with Gestalt psychology may be traced to his collaboration with former Bauhäusler László Moholy-Nagy in the 1930s. After several years of collaboration,

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[139] These laws are discussed in depth in Koffka, *Principles*, 106-176.

[140] Koffka, *Principles*, 176.

[141] See especially Arnheim's *Art and Visual Perception: A Psychology of the Creative Eye* (Berkeley and Los Angeles: University of California Press, 1954).

[142] Roy R. Behrens, "Art, Design and Gestalt Theory," *Leonardo* 31 no. 4 (1998): 299-300.

Moholy-Nagy moved to Chicago to found a new art school – the New Bauhaus – in which he sought to implement many of the concepts and approaches first developed at the German Bauhaus. In 1937, he invited Kepes to join him as the head of the light and color department. Indeed, it was during his time at the New Bauhaus that Kepes wrote his Gestalt-inspired book, *The Language of Vision*, which was eventually published in 1944, two years before he began teaching at MIT.[143] In the front matter of *The Language of Vision*, Kepes began by noting that the concepts of visual organization described in his book were founded on Gestalt psychology.[144] In the text, in addition to reproducing drawings used by the Gestalt psychologists, Kepes illustrated many of these principles with works by artists such as Theo van Doesburg, Piet Mondrian, Pablo Picasso, and Laszlo Moholy-Nagy.[145] (figs. 1.17-1.20)

The first use of Gestalt principles appeared early in the PFoC Study, after the project's official inception in the fall of 1954. During this time, Lynch and Kepes began to explore the city of Boston on foot and by car, developing basic impressions of the city and discussing their initial thoughts on city form.[146] These discussions, which they recorded as a series of "Urban Form Notes,"[147] began to engage the principles of Gestalt

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[143] *Gyorgy Kepes: The MIT Years, 1945-1977* (Cambridge, MA and London: MIT Press, 1978), 9-11.

[144] Kepes in fact expresses his gratitude to Wertheimer, Koffka, and Köhler for their inspiring ideas and visual illustrations. Gyorgy Kepes, *The Language of Vision* (Chicago: Paul Theobald, 1944), 4.

[145] Throughout the book, Kepes favors the art of the Russian Constructivists, the De Stijl painters, the Cubists, and graphic and advertising art, among others.

[146] This series of walks and drives is noted by Lynch in "Appendix A" of the "Progress Report," June 1955, Lynch MSS, 26.

[147] These notes consist only of textual material and are not illustrated. All of the "Urban Form Notes" found by this author in the Lynch MSS were dated 10/54 or 11/54 and include the following: "Urban Form Notes: 10/8/54," "Urban Form Notes: 10/14/54," "Urban Form Notes: 10/25/54," and "Urban Form Notes: 11/9/54," all located in Kevin Lynch Papers, MC 208, PFoC box 1, folder "General Notes," Lynch MSS.

psychology as a tool to help them understand how the larger city Gestalt or organized structure was formed in the minds of its residents. One essential issue in this discussion revolved around how the principles could be extended to the infinite realm of the space of the city: "When we look at a single object we have established a frame of reference of space and use, but in the cityscape there is no defined frame of reference…. With reference to gestalt thought, the dynamics of perception are to take the figure from the background, i.e. to abstract certain figures formed by our consciousness from the unformed background. Our task is: how do we form figures from an experience against a formless background?"[148] In the case of object perception, the beholder's eye was focused on a single area, whereas perception in the urban environment was multi-directional. The authors suggested in these notes that the Gestalt principle of figure against background, in which the perception of the figure emerges from the background through the laws of continuity, closure, and similarity, could be used as a theoretical device. As they discussed, a set of buildings, for example, could be perceived as a group distinct from its background due to similarities of façade, texture, color, or other characteristics.[149]

This concept was further developed in a later "Urban Form Notes" discussion, in which Lynch and Kepes discussed the characteristics of a good city environment. In part, this environment was created by "forms which allow the whole to be realized and the relation of parts and observer to that whole to be felt," and "forms which are in scale,

[148] Gyorgy Kepes and Kevin Lynch, "Urban Form Notes: 10/8/54," Kevin Lynch Papers, MC 208, PFoC box 1, folder "General Notes," Lynch MSS, 1.

[149] Kepes and Lynch, "Urban Form Notes: 10/8/54," Lynch MSS, 1, 3.

which make a good figure, [and] which can readily be grasped and acted upon."[150] The concept of the "whole" and the "good figure" emerged conceptually from Gestalt psychology's laws of visual organization, which acted together in the process of perception. In the environment of the city, the authors argued, both the whole and the good figure emerged more easily when a certain unity or framework for orientation existed. When the framework encompassed larger and more complex wholes, eventually the entire city could be seen as a whole in itself. The authors noted the particular pleasure that resulted when one could see an intricate and multilayered form – such as a city – as a whole.[151]

In this same text, Lynch and Kepes furthermore described a good environment as one that "maximizes perception of things, people, and their relations while minimizing effort."[152] This concept of the minimization of effort was a key concept, relating to the Gestalt principle of simplicity. As they described in their "Framework for the Form of City Study" a few months later, one of the key criteria of good city form was that it was well adapted to man's internal structure through the presence of stimuli that could "be perceived with a minimum of effort and a maximum of information, including those in time sequence as well as those considered instantaneously."[153] In other words, forms which aligned with the laws of Gestalt visual organization were perceived with less effort, a concept that was, in fact, discussed by Gestalt psychologist Rudolph Arnheim in

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[150] Gyorgy Kepes and Kevin Lynch, "Urban Form Notes: 10/25/54," Kevin Lynch Papers, MC 208, PFoC box 1, folder "General Notes," Lynch MSS, 1.

[151] Kepes and Lynch, "Urban Form Notes: 10/25/54," Lynch MSS, 2-3.

[152] Kepes and Lynch, "Urban Form Notes: 10/25/54," Lynch MSS, 1.

[153] Lynch and Kepes, "Framework," Lynch MSS, 2.

one of the seminars held by Lynch and Kepes that fall as part of the PFoC Study.[154] In this seminar, Arnheim presented the ways in which Gestalt psychology could offer basic principles for a study on spatial perception at the scale of the city. As he explained, "Any incomprehensibility of pattern challenges the organism automatically to a search for comprehension, i.e. makes for expense of energy."[155] While an entirely chaotic environment thus frustrated the organism's attempt to create a perceptual framework for orientation, neither was too little stimulation desirable, as the kind created by an entirely homogenous surface. Such homogeneity was composed of low-level stimulation that failed to engage the dynamic processes of orientation required by all living organisms.[156] Rather, "a highly structured stimulus is a prerequisite of… perception involving the higher mental powers of distinction between the essential and the unessential, the central and the peripheral" and "is an important aspect of being and keeping alive mentally. A desirable cityscape should elicit this kind of active perception."[157]

The urban renewal and highway construction projects occurring in Boston in the early 1950s provided the context for the focus on visual urban form evinced in the PFoC Study. Despite this heightened interest in the possibilities and promise of urban renewal

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[154] Arnheim was one of several psychologists and artists invited to speak that semester. Others who either presented or engaged in seminar discussions with Lynch and Kepes include composer John Cage, photographer Andreas Feininger, novelist James Farrell, cinematographer Boris Kaufman, painter Ben Shahn, and Harvard psychologists J. Bruner and S. Tagiuri. See "Appendix A" of Lynch, "Progress Report," June 1955, Lynch MSS, 26. Arnheim was also one of the professionals who received Lynch and Kepes's "A Framework for the Form of City Study," in December of 1954. See Kevin Lynch and Gyorgy Kepes, "The Perceptual Form of the City: People Contacted," Kevin Lynch Papers, MC 208, PFoC box 1, folder "Comments on Original Proposal and General Framework," Lynch MSS.

[155] "The Perceptual Form of the City: Notes by Dr. Rudolph Arnheim presented at a seminar, 10/29/54," Box A, Folder "(D) 2," Thiel MSS, 1.

[156] "Notes by Dr. Rudolph Arnheim," Thiel MSS, 1-3.

[157] "Notes by Dr. Rudolph Arnheim," Thiel MSS, 3.

in the early 1950s, it is interesting to note that the involvement of planners in urban renewal projects was not required on a federal level until 1954. The Housing Act of 1954 required cities for the first time to develop a long range "workable program" that detailed public improvements, zoning, and subdivision regulations. In addition, cities were asked to carry out neighborhood studies on the extent of blight and maintain adequate standards of health, sanitation, and safety before federal funding was granted, as well as detail how the city would finance its share of the project and re-house dislocated families.[158] Despite these ambitious provisions, many cities continued to plan one discrete project at a time without consulting a comprehensive plan and were notoriously lax in administering relocation programs for displaced tenants.[159]

The number of specialized planners in the country was still relatively small at the time, meaning that many of those involved in creating these workable plans came from many fields, including architecture, public administration, and economics. Despite the fact that membership in the American Institute of Planners more than doubled in the 1940s, the total number of planners in the country was less than 700 in 1949, a meager amount considering that planning departments in cities of 250,000 or more employed more than 650 people each. However, as more and more cities were in need of advanced metropolitan and regional planning bodies experienced in the processes of initiating new developments on vacant sites, planning programs began to appear all over the country,

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[158] Lowe, 36; Scott, 501; and Bellush and Hausknecht, 15.

[159] Studies have shown that while renewal projects often began with promises of affordable relocation housing, these promises had often disappeared by the time the families were forced from their homes, often with less than $100 in relocation fees and little aid in obtaining new housing. Frieden and Sagalyn, 33.

educating a generation of planners in the exigencies of physical urban planning and adding another dimension to the urban planning process.[160]

By the mid-1950s, landscape architects were likewise becoming more invested in the future of highway design and planning. In 1955, The American Society of Landscape Architects (ASLA) researched, prepared, and endorsed a set of highway design criteria titled "Expressway or Parkway: Desirable Design Factors Underlying Highway Construction." Prepared by the ASLA's Committee on Public Roads, Controlled-Access Highways, and Parkways, the criteria were published in *Landscape Architecture* and also reprinted as a standalone brochure by the HRB. The publication addressed various design techniques, such as using topographic maps to aid in route location and modifying road alignments to improve both safety and aesthetic experience and, perhaps most importantly, the report examined how landscape architects could collaborate with architects and engineers to improve highway design and planning.[161] Other articles in the journals *Landscape* and *Landscape Architecture* continued over the following years to explore the manifold contributions that the landscape architect could bring to highway planning and design, broadening the existing aesthetic debate surrounding highways and seeking to expand professional participation in the endeavor.[162]

In 1955, Halprin expanded upon the concepts of choreography and movement he had been developing over the course of the late 1940s and early 1950s by incorporating

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[160] Scott, 468-469.

[161] American Society of Landscape Architects, Committee on Public Roads, Controlled-Access Highways, and Parkways, *Expressway or Parkway: Desirable Design Factors Underlying Highway Construction* (Washington, D.C.: Highway Research Board, 1955).

[162] See, for example, Eugene R. DeSilets, Geraldene Knight Scott, and Wilbur H. Simonson, "Highway Aesthetics," *Landscape Architecture* 48 no. 1 (October 1957): 28-37 and B. E. F., "Highways as Scenery," *Landscape* 12 no. 2 (Winter 1962-63): 23-24.

examples from his growing landscape architectural practice.[163] At a time when he was embarking on his own professional career and testing out ideas, the garden became the ideal arena for him to put his beliefs in sequence and choreography into practice, not only in the garden commissions he obtained but also in the pieces he wrote for magazines and journals. In an article titled "Choreography in the Landscape," published in 1955 in the student publication of the School of Design at the North Carolina State University,[164] Halprin began: "Garden spaces are like stage sets for dance through which people move in ordered and rhythmic patterns." The objects within the landscape moved relative to the moving individual, from side to side, from in front to behind, all the while receding and expanding in "a patterned time sequence which takes on all the aspects of a dance composition." Halprin expanded the simile between dance and landscape with allusions to variations in tempo, composition, and static counterpoint. The three-dimensional horizontal and vertical arrangement of the garden, for Halprin, had the capacity to manipulate and guide the movement of the people "within it into a choreography closely related to dance."[165]

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[163] There is no evidence that Halprin was in correspondence with Lynch or Kepes in the 1940s or 1950s. Although all three spent time in Cambridge, Halprin left Harvard in 1943, long before Lynch and Kepes began teaching at MIT.

[164] Halprin taught a landscape architecture studio at the North Carolina State University during the fall semester of 1954. Lawrence Halprin, "Choreography in the Landscape," *Student Publication of the School of Design, North Carolina State University*, Raleigh, NC (Spring 1955): 40. For another article written during this time, see Lawrence Halprin, "The Art of Garden Design," *Journal of the Royal Architectural Institute of Canada* (July 1954): 226-230.

[165] Halprin, "Choreography in the Landscape," 40. In this article, Halprin also more clearly distinguished between the gardens of old and those of today, a contrast he had already discussed in his earlier *Impulse* article. The earlier and more formalized gardens were largely static and any movement was proscribed into rigid patterns down axes that were visual more than they were physical. As such, the gardens had a "confining symmetry [that] echoed in a three-dimensional sense the societies' urge toward order and refinement," with a tempo and rhythm that was much more quiet and orderly. These impulses, captured in the formal gardens of the 18th and 19th centuries, were also reflected in the dances of the time: "This was a time of courtly gaillards and minuets those slow and pompous court dances in which ladies and gentlemen,

According to Halprin, the most critical step in creating a dynamic garden was the arrangement of the site plan and relationship between the house and the land: "We need always to think of the choreographic implications of these decisions, and how strongly site use and site plan affect the living and moving patterns of the family." Shifting of levels, walls, and ditches could provide vertical variation while the horizontal could be modulated through screens, hedges, low walls, and the weaving of terraces, walks, and pathways. Just as important was the shifting relationship between the moving observer and the static object: "As movement occurs through garden spaces, one's relation to objects become one of ebb and flow, of nearness and farness, of close contact, passing and then leaving behind."[166] Speed, too, was a factor in perception, as the design of landscape seen from a fast-moving vehicle required a different approach than one experienced by the individual on foot. The incorporation of design for movement could not only create a landscape that was a work of art, but it could also imbue the movement itself with all the high quality of dance."[167]

This same year, in 1955, Lynch and Kepes began to explore the perceptual effects of speed and movement as part of their larger study on the Perceptual Form of the City. In a document titled "Study of the Perceptual Quality of City Circulation," Lynch and Kepes proposed to examine all modes of city circulation and their impact on visual

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ranging themselves on either side of a long hall, bowed and curtseyed, extended hands and glided past each other in measured tempo." Halprin, "Choreography in the Landscape," 41. It is interesting to note that while Halprin attacked the "static" gardens of the eighteenth and nineteenth centuries, he did not acknowledge the concurrent practices of English landscape gardening that sought to draw visitors through the landscape with many of the same visual and physical devices extolled by Halprin himself – an omission that is both curious and puzzling.

[166] Halprin, "Choreography in the Landscape," 42-43.

[167] Halprin, "Choreography in the Landscape," 43-44.

perception. The perceptual consequences of travel along all major circulation systems of the city would be examined, including "the experience of being part of the flow: the sequence of impressions received while walking, cycling, driving, riding, boating; and how the scale, tempo, and quality of these sequences differ."[168] The awareness of the perceptual effects and functions of both space/motion and orientation were highlighted, with circulation discussed as a potentially ordering force in the urban structure.[169]

For Kepes in particular, the process of relating to the environment through the dynamic organization of visual information was synonymous with the concept of orientation. As he explained, it was through this process of spatial orientation that man came to know and understand his environment. At its most basic level, this orientation involved a "patterning of incoming sensory signals into visually coherent features: units, groups, and relationships"[170] as part of the dynamic process of structuring the potential chaos of visual information available to the eye. He concluded that "man orients himself by relating his body to the forms and voids that surround him and in the most developed state builds a coherent spatial world in which everything is related to everything else –

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[168] This plan first appeared in an appendix to the progress report Lynch and Kepes submitted to the Rockefeller Foundation in 1955 and was included there as an avenue of future research. Lynch, "Progress Report," June 1955, Lynch MSS, 36. See also the undated document: "Proposal for a study of circulation in the city, in terms of its perceptual impact," Kevin Lynch Papers, MC 208, PFoC box 1, folder "Project - Other Lines," Lynch MSS. This document, although undated, seems to have been written after the Progress Report of 1955 as it presents the project in slightly greater detail and lengthier fashion. This proposal seems to be one of at least four that were considered in addition to the projects already being carried out. The others are: "Proposal for a general study of attitudes toward the city," "Proposal for a study of the use of water surfaces in the city," and "Proposal for a major project on the means of orientation of the city," all located in Kevin Lynch Papers, MC 208, PFoC box 1, folder "Project - Other Lines," Lynch MSS. The latter seems to have been the one used by Lynch to develop his *The Image of the City* publication at the end of the study.

[169] Lynch, "Progress Report," June 1955, Lynch MSS, 37.

[170] Gyorgy Kepes, "Introduction," 22 October 1956, Kevin Lynch Papers, MC 208, PFoC box 1, folder "General Statements (2 of 2)," Lynch MSS, 4.

including the observing eye."[171] In a description of "a study of the means of orientation and recognition in the city," written as part of their 1955 "Progress Report" to the Rockefeller Foundation, Lynch explained orientation to the city environment through Gestalt principles of visual organization, with the formation of the Gestalt perceptual whole likened to the development of a similarly whole city image:

> Artists have developed from experience many techniques which facilitate the making of visual wholes. They know the importance of similarity and contrast in crystallizing form; the use of the devices of grouping, continuance and closure in the organization of the visual field; and the employment of scale and coherent spatial form in the unification of the three-dimensional world. We now face the problem of maintaining continuity in a changing flow, structuring the change itself by means of rhythm, progression and counterpoint. This is particularly appropriate to the analysis of the city experience, with its duration and movement…. All of this material, however, must be transferred only with caution to the medium of the city and its vastly different scale.[172]

Lynch himself wrote two papers in the mid-1950s that explored issues relating to urban form and perception. The first, "The Form of Cities," was published in *Scientific American* in 1954, and the second, "Some Childhood Memories of the City," was written with Alvin K. Lukashok and published in the *Journal of the American Institute of Planners* (JAIP) 1956.[173]

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[171] Kepes, "Introduction," Lynch MSS, 4.

[172] Lynch, "Progress Report," June 1955, Lynch MSS, 16-17.

[173] See Kevin Lynch, "The Form of Cities," *Scientific American* 190 no. 4 (April 1954): 55-63 and Alvin K. Lukashok and Kevin Lynch, "Some Childhood Memories of the City," *Journal of the American Institute of Planners* 22 no. 3 (Summer 1956): 142-152. Articles at the end of the decade that addressed similar themes included "Environmental Adaptability" and "A Theory of Urban Form," the latter with Lloyd Rodwin, both published in JAIP 1958, and "A Walk Around the Block," written with Malcolm Rivkin and published in *Landscape* in 1959 See Kevin Lynch, "Environmental Adaptability," *Journal of the American Institute of Planners* 24 no. 1 (1958): 16-24; Kevin Lynch and Lloyd Rodwin, "A Theory of Urban Form," *Journal of the American Institute of Planners* 24 no. 4 (1958): 201-214; and Kevin Lynch and Malcolm Rivkin, "A Walk Around the Block," *Landscape* 8 no. 3 (Spring 1959): 24-34.

Philip Thiel and The Perceptual Form of the City

Although Thiel graduated from MIT in 1952,[174] he returned for a summer in 1956 to assist Lynch and Kepes on the PFoC Study.[175] For Thiel, his work with Lynch and Kepes at MIT was a steppingstone on the path of development toward his own notation system later. Over the course of the summer, Thiel worked with a series of photographic sequences through the city of Boston. Thiel's goal was to analyze how the visual field changed as the observer moved through it and determine which features of the cityscape most affected the visual experience of movement through space. He created a series of overlays of the photographs that filtered out selected elements like lampposts and building facades to analyze their effect on an observer's experience of space. According to Thiel, the experience drove him one step closer toward developing his notation system

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[174] Due to his prior work at the Webb Institute, Thiel graduated in only two years, in 1952. Thiel, interview. After graduation, Thiel left for Europe, where he spent three months in Rome as a consultant for a fishing boat design conference at the United Nations and then another six months traveling around the continent on prize money from MIT. Thiel, "Ham on Wry," 2; Thiel, "To the Ipswich Station," 15. During his travels, he visited England, France, Denmark, Sweden, and Germany and although he was not yet thinking about developing his notational system, he began keeping journals in which he sketched and noted ideas. Thiel returned to the United States early in 1953 and went to work in the architecture office of Marcel Breuer as well as the Museum of Modern Art. Seeking a route to the West Coast, Thiel contacted William Wurster, dean of the School of Architecture at the University of California in Berkeley and former dean at the School of Architecture at MIT from 1944-1949. Wurster offered Thiel a teaching position at Berkeley as well as work in Wurster's own architectural practice in San Francisco. Thiel, "Ham on Wry," 2; and Marc Treib, *An Everyday Modernism: The Houses of William Wurster* (Berkeley: University of California Press in association with the San Francisco Museum of Modern Art, 1995) 228-229.

[175] This experience was not, in fact, Thiel's first in working with Lynch; during his travels through Europe in 1952 and 1953, Thiel had prepared studies of Marseilles and Brieve, France, which he sent to Lynch to be included in a series of reports Lynch was collecting that sought to analyze how individuals oriented within and experienced a city. Thiel, interview ; and Letter, Philip Thiel to Kevin Lynch, 6 February (n.y.), box 4, folder "Imagability – General Statements (2 of 2)" Lynch MSS. Lynch himself had traveled through Europe around the same time with his family and did, at one point, meet up with Thiel (as recalled by the latter in an interview with the author). Indeed, David Crane has asserted that Lynch's experience traveling through Italy in 1953 marked the beginning of his studies in perception. See David A. Crane, "Book Review: Image of the City by Kevin Lynch," *Journal of the American Planning Association* 27 no. 2 (1961): 152-155. Two years after returning from Europe, Lynch and Kepes began directing the studies at the Center for Urban and Regional Studies of MIT that would be published as *The Image of the City.*

because he was forced to explore alternate ways of structuring and describing all the visual information he was handling.[176]

Over the course of the summer, Thiel prepared several reports in which he attempted to find a way of describing (and, at times, quantifying) the experience of a given space. In a memorandum titled "Inventory of Elements" from August 13th, Thiel attempted to describe the spatial characteristics in eight different images from a photographic series of Copley Square. The memo was originally accompanied by eight ink tracings that graphically recorded the spaces, surfaces, and volumes in the photographs. According to the notations in the memo, space was recorded by line drawing; surfaces by photo-tracings, and volumes by contour photo-tracings. Although the tracings are now lost, the memo represents one of Thiel's earliest attempts at classifying space into the three main categories of space, surface, and volume.[177] Thiel explained that this method of categorization could be useful in opening students' eyes to the defining elements of the cityscape as well as provide an objective way of comparing different places in terms of the relationships and relative percentages of defining elements.[178]

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[176] The photographs were taken by Nishan Bichajian, who was documenting the work being done by Lynch and Kepes in the city. Thiel, interview.

[177] These elements would later define the "Anatomy of Space" he used in his notation system (see Chapter 2). Although Thiel made no reference in this text to the exhibition catalog of 1932 written by Henry Russell Hitchcock and Philip Johnson, *The International Style: Architecture Since 1922*, Thiel's division of architecture into space, surface, and volume bears remarkable similarity to the characteristics noted in the catalog as particular to the new style, including "a new conception of architecture as volume rather than as mass." Henry Russell Hitchcock and Philip Johnson, *The International Style* (New York: W.W. Norton, 1995), 36.

[178] Notes to Kevin Lynch from Philip Thiel, "Morphology Study – Copley Square," 13 August 1956, box 4, folder "Small Area Study", Lynch MSS

At this time, Thiel began to develop a very early form of his notation system, similar to the "sequence summary" included in his B.Arch thesis four years earlier. In a report titled "Notes on a method of recording and analyzing sequences of urban space and color," dated July 30th, Thiel developed a map-like system of capturing the color and enclosure along a given journey. Although this system most resembled an architectural plan, in that it was recorded from an abstracted, raised perspective, it attempted to use a time scale to capture the sequential nature of spatial experience. Thiel's central premise in the report was that "the cityscape is a dynamic process involving the consumption of time… [and] must be experienced in some temporal sequence." [179] Thiel asserted that urban design was ultimately experienced at various time scales from the pedestrian to the motorist. As a result, the method recording urban space had to be flexible enough to allow changes of time scale along a given sequence.

He described his preliminary concept as a "modified map-diagram, arranged lineally and covering as extensive a course as is desired" [180] and as a "sort of spiney attenuated figure which is 'read' by moving the eye along its length in the proper direction," ideally from the bottom of the page upwards.[181] The diagram consisted of a path through the city that was laid out on a sheet of paper as a standard plan, with horizontal surfaces along the pathway drawn alongside the trajectory for as long as they were experienced. The vertical dimension of the surface was indicated obliquely to the direction of the trajectory and faded out at the distance where the surface no longer

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[179] Notes from Philip Thiel, "Notes on a method of recording and analyzing sequences of urban space and color," 30 July 1956, box 4, folder "Small Area Study", Lynch MSS, 1.

[180] Thiel, "Notes on a method," 3.

[181] Thiel, "Notes on a method," 5.

impacted the eye. Colored pencil was used to indicate the hue of a given surface, perpendicular to the trajectory of the pathway.[182] Thiel noted that only those horizontal and vertical surfaces that fell within a certain standard field of vision should be recorded, based on the work of Wesley Woodson in his *Human Engineering Guide for Equipment Designers*.[183] For a pedestrian moving at 3mph the field was specified to be 120 degrees; for a motorist moving at 20mph, 100 degrees; at 40mph, 80 degrees; and at 60 mph, 60 degrees. As Thiel explained, the pedestrian had the largest field of view because he had the most time to scan and could use both eye and head movement, while the auto driver was restricted by the enclosure of the car, the presence of other passengers, and most importantly by the need to pay attention to surrounding traffic.[184]

Thiel continued to experiment with alternative means of describing spatial experience. In September of 1956, he developed a quantitative method of describing the perceived degree of lateral enclosure.[185] In this addendum, Thiel presented a formula by which actual lateral enclosure was modified to reflect the height of the enclosing surface. In Thiel's own words, "This present note substitutes an objective procedure and takes into account the height of the vertical defining surfaces, the lateral position of the observer in the circulation channel, and the assumed horizontal and vertical fields of

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[182] Thiel, "Notes on a method," 4-5.

[183] Wesley E. Woodson, *Human Engineering Guide for Equipment Designers* (Berkeley: University of California Press, 1954).

[184] Thiel noted that the field of vision was based on a "standard" observer and acknowledges that his method has limitations and is only a starting point. Moreover, he was aware that the method was rather subjective but insisted that the subjectivity was immaterial as long as the same method was used throughout. Thiel, "Notes on a method," 3-4.

[185] Notes from Philip Thiel, "A note on a method of diagramming lateral enclosure along an urban path of circulation," 15 September 1956, box 4, folder "Small Area Study", Lynch MSS. These notes were written as an addendum note to his previous memo of July 30th.

vision."[186] In other words, he developed a modifying factor which, when multiplied by the actual lateral distance, would yield the virtual lateral distance of a surface. The modifying factor itself was determined by the relationship between the visible height of the vertical surface and its actual height, with the visible height defined through geometric functions of tangent and sine. This formula is admittedly of little use, as it is difficult to understand – let alone use – and because it attempted to objectively quantify through mathematical means a visual effect that was primarily subjective in nature. It epitomized Thiel's early preoccupation with finding any means possible to standardize the experience of space, no matter how abstruse.

Thus, highway construction and urban renewal provided opportunities for city planners and architects such as Kevin Lynch, Gyorgy Kepes, and Philip Thiel to envision large-scale urban design as experienced by an individual in movement. This design for movement, motivated solely by visual concerns, was on the one hand naïve for its deliberate rejection of the many other economic, political, and functional requirements of urban design. On the other, this approach sought to draw attention to a perspective that was often overlooked in large scale raze-and-redevelop construction of the mid-twentieth century. As will be discussed in the next chapter, federal legislation on highway construction of the late 1950s coincided with a heightened focus on the view of the city as experienced from behind the wheel of a moving car and a concurrent interest in shaping the metropolis for a culture increasingly dominated by the personal automobile.

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[186] Thiel, "diagramming lateral enclosure," box 4, folder "Small Area Study", Lynch MSS.

CHAPTER 2

The Imageability Study of Highways, 1956-1959

In 1956, Lynch singled out the highway from other modes of urban circulation in a directed project on the "Imageability study of highways" as part of his larger Perceptual Form of the City Study.[187] This same year, the Federal-Aid Highways Act of 1956 was signed into law,[188] calling for a national network of highways that would connect most of the state capitals and 90% of the cities with populations of 50,000 or more.[189] Of the total 41,000 miles of highway authorized in the act, 6,100 miles were earmarked for urban areas in the form of four- to eight-lane limited access freeways.[190] The Act was

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[187] The earliest statement of intent for the highway project exists in the form of a text written by Lynch on "The Sensuous Impact of Highway Driving," from August 1956. Although the project is not explicitly titled in this document, related notes in Lynch's own handwriting refer to the project as the "Imageability study of highways." These notes are undated; however, it is clear that both documents refer to the same project and were prepared in the preliminary stages of the project. See Kevin Lynch, "The Sensuous Impact of Highway Driving," 1 August 1956, and "Imageability study of highways: some possible approaches and types of transition," both located in Kevin Lynch Papers, MC 208, unprocessed box 4b, folder "Hwy-General Statements," Lynch MSS.

[188] Unfortunately, it is not possible to conclusively determine whether the passage of the Interstate Highway Act contributed to Lynch's decision to focus his attention on the highway as a mode of circulation, as none of his notes indicate the underlying motivations for his choice of focus.

[189] Scott, 537.

[190] Frieden and Sagalyn, 21, and Scott, 537. These highways were indispensable parts of the larger statewide highway system and were lobbied for aggressively by both mayors and central business district interests, who envisioned these limited access freeways as a way of both alleviating downtown traffic within city streets and revitalizing the center city by making it easier to access. Although urban highway construction was a small subset of a given state's comprehensive highway plan in terms of mileage, a disproportionate amount of authorized federal funding went to construction of highways in and around cities; between 1956 and 1966, $15 billion of the $27 billion spent on highway construction was used in urban areas [Frieden and Sagalyn, 20-22 and Kenneth Fox, *Metropolitan America: Urban Life and Urban Policy in the United States, 1940-1980* (Jackson, MI: University Press of Mississippi, 1986) 103].

financed through taxes on gasoline and diesel as well as special motor taxes, which were held in a Highway Trust Fund that could be used only for highway construction and could never be allowed to show a deficit.[191] According to Kemp, the Interstate Highway Act of 1956 “propelled state engineers into the city planner’s domain,”[192] and inextricably interwove issues of city planning and highway design through its focus on urban construction.[193] It was the largest federally-funded construction program yet undertaken, but did not require states to consult metropolitan or regional planning agencies for review. This enabled highway construction to proceed without consideration for comprehensive redevelopment or alternative modes of urban transportation such as mass transit.[194]

Lynch’s highway project reflected this singular focus on automobile transportation as well as themes from the early PFoC Study, including exploration of the perceptual effect of variable speeds of movement and interest in developing graphic techniques to record spatial experience (see Chapter 1). Imageability was a term Lynch invented and later defined as “that quality in a physical object which gives it a high probability of evoking a strong image in any given observer. It is that shape, color, or arrangement which facilitates the making of vividly identified, powerfully structured, highly useful mental images of the environment. It might also be called *legibility*, or

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[191] Johnson, *Laws That Shaped America*, 277, 278.

[192] Kemp, 762-763.

[193] Title I of the act authorized $26 billion in federal funds over a thirteen-year period and established an cost-sharing formula unprecedented in the country’s history of federal involvement in highway construction. As opposed to the old formula, which split the federal/state responsibility down the middle, Title I stated that the federal government would provide 90% of the funds, while the states would pay the remaining 10%, with no commitment required from cities. Johnson, *Laws That Shaped America*, 277.

[194] The act did not provide any funding for the development of mass transit networks. Scott 536-539.

perhaps *visibility* in a heightened sense, where objects are not only able to be seen, but are presented sharply and intensely to the senses."[195] In August of 1956, Lynch developed a de facto prospectus for the imageability study of the highway, titled "The Sensuous Impact of Highway Driving." In this text, Lynch focused on the perceptual impact of the urban highway in particular, explaining that the object of the highway study was "to discover means of making the trip a delightful, revealing, and dramatic sensuous experience."[196] Lynch suggested that this could be done by heightening the drama of the road and the act of driving through variation in spatial and visual impressions and also by establishing a clear framework for urban orientation through emphasis on landmarks, points of decision, and other elements intersected by the path of travel. He focused on the role of visual perception in the formation of the highway experience, suggesting the immense potential in "organizing the driving experience dynamically, as if it were a melody," using "the techniques of crescendo and climax; prior hint; concealment and revelation; relaxation and tension; timing and rhythmic organization; [and] surprise."[197]

The first two years of the imageability study of highways were primarily characterized by the development of the basic principles underlying the visual analysis of a highway.[198] Lynch's "Principal Elements of the Highway Experience," written the following year in 1957, outlined the central effects of space, motion, traffic, imageability, meaning, and sequence in the construction of the experience but did not discuss graphic

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[195] Kevin Lynch*, The Image of the City* (Cambridge, MA: MIT Press, 1960) 9-10.

[196] Lynch, "Sensuous Impact," Lynch MSS, 1.

[197] Lynch, "Sensuous Impact," Lynch MSS, 3-4.

[198] The concepts discussed in this text later became the key principles of *The View from the Road*, reflecting Lynch's early engagement with the role of visual and spatial perception in the construction of the highway experience (see Chapter 4).

techniques, suggesting that although a primary visual analysis had already been undertaken, a method to record it may not have yet been developed.[199] Over the following two years, between 1958 and 1959, Donald Appleyard joined Lynch on the imageability study of the highway as a graduate student research assistant. Appleyard had graduated from the Architectural Association in London and then came to MIT in 1956 to earn his Master's degree in city planning.[200] During his two-year tenure as a graduate student, Appleyard accompanied Lynch on the extensive field research required for the study, particularly on trips along the Northeast Expressway, one of the newly completed radial expressways that had been designed as part of the *Master Highway Plan* of 1948.[201] At the time the *Master Highway Plan* was prepared, an elevated six-lane bridge was in the process of being built over the Mystic River just north of Boston. The plan recommended that the bridge be connected on the south end to the proposed Inner Belt and Central Artery through an elevated connection over City Square in Boston. On

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[199] Kevin Lynch, "Principal Elements of the Highway Experience (DRAFT)," 1 December 1957, Kevin Lynch Papers, MC 208, unprocessed box 4b, folder "Hwy-General Statements," Lynch MSS, 1-5. In "Sensuous Impact of Highway Driving," Lynch proposed to attack the problem primarily through the preparation of imaginary sketches, sequential photographs, and verbal descriptions of major metropolitan highways (Lynch, "Sensuous Impact," Lynch MSS, 4). "Principal Elements of the Highway Experience," on the other hand, did not discuss methodology at all and consisted primarily of an assessment of the major visual elements of the highway experience. Lynch, "Principal Elements," Lynch MSS, 1-5.

[200] Appleyard received his Master's in City Planning in 1958. He worked at the architecture firm of Hugh Stubbins in Cambridge until 1959, at which point he moved to Berkeley, CA, to work with DeMars and Reay Architects. He returned, however, to MIT in 1961 as an Assistant Professor of Urban Design in the City Planning Department. He remained there, working also at the newly formed Joint Center for Urban Studies, until 1967 when he accepted a position at the University of California, Berkeley as Associate (and later full) Professor of City and Resource Planning and Landscape Architecture. See: "Appleyard Obituary," Office of Public Information, Berkeley Campus, University of California, 29 September 1982; Kevin Lynch, "Fullbright Reference Report" for Donald Appleyard c. 1982-83; and "University of California Biography for Academic Personnel, Donald Appleyard, Berkeley Campus, Landscape Architecture Department," 1 January 1983; all located in Folder "Appleyard, Donald, 1983," Box 14, Lynch MSS.

[201] Although the Central Artery and several of the radial expressways were constructed in Boston in the 1950s, the Inner Belt was never built. See Chapter 1 for more on the Master Highway Plan and refer to footnote 63 in the section on "freeway revolts" later in this chapter for more on the fate of the Inner Belt.

the north, the bridge would be connected to existing U.S. Route 1, which would be improved in later stages to account for increased speeds and capacities, through new construction that stretched through Chelsea and Revere. This new expressway, stretching from the Central Artery and Inner Belt, over the Mystic River Bridge, and connecting to the highways of the northeast corridor, was appropriately called the Northeast Expressway. The connection to the south was prioritized in the *Master Plan* for construction in stage one and was completed in 1953; the construction to the north, which was scheduled as part of stage two, was finished five years later.[202] (fig. 2.1)

The Northeast Expressway opened to traffic in 1958 and among its travelers were Lynch and Appleyard. They observed, in detail, the experience of approaching Boston from the north on the Northeast Expressway, over the Mystic River bridge, and into the city on the Central Artery.[203] (fig. 2.2) Although the entire length of the Artery did not open until 1959, segments of the road opened earlier, as soon as they were completed.[204] At the time of Lynch and Appleyard's analysis, the Artery was only open as far as the Fort Hill Exit in downtown Boston, just to the north of South Station.[205] They repeated

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[202] Maguire, 57-59 and 106-108 and Massachusetts Department of Public Works, *A report of progress to Governor John A. Volpe on the Massachusetts highway program and other department activities* (Boston: Department of Public Works, 1961), 50-53. Massachusetts, along with other states such as New York and California, engaged in highway planning and construction before the Interstate Highway Act of 1956 went into effect. Scott, 586. Prior to 1956, the government provided states with matching funds, i.e. split 50/50 between federal and state, for the construction of highways that were "interstate in character." Johnson, *Laws That Shaped America*, 267. See Chapter 1.

[203] See the following folder for extensive documentation of the research undertaken by Appleyard and Lynch along the Northeast Expressway: Kevin Lynch Papers, MC 208, unprocessed box 4b, folder "Hwy-General Statements," Lynch MSS. The notes include analyses of motion and space under the headings "KL" and "DA" and "KL-DA discussion," as well as "Motion & Space diagram to show." The analysis of orientation (also described as "topo, use-activity, marks, sense of arrival & location) follows a similar pattern, reflecting the collaborative nature of the field trips and research.

[204] O'Connor, 119.

[205] Appleyard, Lynch and Myer, *View from the Road*, 29.

the trip over and over, recording verbal observations on a tape recorder, composing rapid freehand sketches of dominant visual forms on a notepad, and using a camera to take snapshots along the way (figs. 2.3, 2.4). In addition, they took extensive written notes that described the locations of important views and landmarks seen from the road at various minute markings along the journey. These observations, sketches, snapshots, and notes contributed to the assembly of a diagram that recorded the "locus of attention" along the journey.[206] (fig. 2.5)

Visual representations of the experience from the highway were being researched during the late 1950s in at least one other American school of city planning. In 1958, Louis B. Wetmore, a professor in the Department of City Planning and Landscape Architecture at the University of Illinois, published an article in the Highway Research Board (HRB) *Bulletin* titled "Visual Approach to Highway Planning and Design." In this article, Wetmore asserted that visual design could be broadly defined and that its "principles can be developed and applied to certain problems in highway design so as to minimize ugliness and dreariness and maximize safety and convenience. It is further

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[206] One such description, titled "Commentary on the Mystic Route," reports on multiple trips taken by Appleyard and Lynch over the Northeast Expressway route into Boston on 6 December 1958. Although the text is a synthesis of the verbal description of the route by the two men, it also notes that many features of the trip could be better captured through graphic rather than verbal means. Because it does not yet refer to the notation system, it is possible that it had not yet been developed at this point. See Donald Appleyard and Kevin Lynch, "Commentary on the Mystic Route," c. 6 December 1958, Kevin Lynch Papers, MC 208, unprocessed box 4b, folder "Hwy-General Statements," Lynch MSS, especially pages 1 and 17. A separate study was also carried out slightly later in 1960 in which a research assistant, Richard Peterson, drove twenty participants over the same section of the Northeast Expressway analyzed by Lynch and Appleyard. The participants were asked to record their impressions of the highway by executing rapid sketches of what they saw on paper. The elements along the highway that they chose to sketch contributed to the authors' conclusions regarding which factors had the highest visual and perceptual impact. The benefits of analyzing sketches from participants with a wide range of graphic skills was noted as limited. Richard A. Peterson, "Form of the Highway Research," Cambridge, MA, 20 July 1960, Kevin Lynch Papers, MC 208, unprocessed box 4b, folder "Hwy-General Statements," Lynch MSS. As noted in the front matter to *The View from the Road,* Peterson was responsible for carrying out the fieldwork on "sketch interviews on the Northeast Expressway," but the rest of the research was carried out by the three listed authors (Appleyard, Lynch and Myer, *View from the Road*, 2).

asserted that these same principles applied to alignment location and other aspects of highway planning would contribute toward maintaining and enhancing economic values by fitting the highway into its environment."[207]

As opposed to the large metropolitan areas studied at MIT, the University of Illinois research, which began in 1956, focused on a wide range of smaller contexts and slower speeds. Rural and toll roads were studied, as well as slow-moving vehicle situations; the only urban situations analyzed consisted of small to medium sized cities. Rather than developing a notation system, Wetmore's team primarily explored methodologies for "inventory and recording of visual and other perceptual elements of the street or highway environment" and sought to amass a "vocabulary of words and graphic symbols to identify perceptual elements and their visual relationships."[208] Unlike the MIT team's notation, Wetmore's symbols simply described the elements of the landscape, such as transmission towers, parking lots, meters, and garages. Various aerial maps were prepared showing locations of major features along the streetscape, and while certain key views were occasionally shown in section, the stretches of blank white space between these views prevented any sense of continuous representation to the notation system.[209] (fig. 2.6, 2.7) For Wetmore, the primary purpose of his visual analysis "was not primarily to gather evidence upon which to redesign the route, but to develop powers of observation and selection of such objects as are relevant to speed." He continued, "Things seen, and their significance in movement, have been the subject of scattered and

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[207] Louis B. Wetmore, "Visual Approach to Highway Planning and Design," *Highway Research Board Bulletin* 190 (1958): 30.

[208] Wetmore, "Visual Approach," 31.

[209] Wetmore, "Visual Approach," 32-37.

spasmodic research; but the time has come when the need for collective and consistent assessment upon which recommendations and action can be taken is now a matter of pressing urgency."[210]

It is interesting to note that Wetmore was on the faculty at MIT when Lynch began his research on the visual form of the city. In fact, it was Wetmore who wrote to Lynch while the latter was in Florence on a grant from the Ford Foundation in 1953 to inform him of Kepes's earliest submission of a research proposal on "The Cityscape" to the Rockefeller Foundation and to inquire about Lynch's interest in participating in the study upon his impending return to America.[211] As such, it is perhaps unsurprising that in his article of 1958, Wetmore also included a summary prepared by Lynch on the progress of the MIT research into the visual design of the highway. In this summary of 1958, Lynch wrote: "The problem set was the nature of the perceptual experience received while driving or being driven on the high-speed urban highway, and the means by which this experience might be made more pleasant and meaningful…. The principle premise underlying the work is that… the highway experience will be one of the major ways in which citizens will be able to grasp the form of their extended metropolitan regions."[212] Lynch wrote further that a major goal of his future studies on the highway was "the development of a means of representing the experience, so that the quality of

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[210] Wetmore, "Visual Approach," 38.

[211] Lynch received a grant from the Ford Foundation to spend a year in Europe in 1952-1953. The proposal was discussed with the Rockefeller foundation while Lynch was still in Europe but the study did not officially commence until Lynch returned to MIT to begin directing the project with Kepes. Banerjee and Southworth, *City Sense*, 20; and Letter, Louis B. Wetmore to Kevin Lynch, 11 May 1953, Kevin Lynch Papers, MC 208, PFoC box 1, folder "Early Steps," Lynch MSS; and Letter, Kevin Lynch to Louis B. Wetmore, 17 May 1953, Kevin Lynch Papers, MC 208, unprocessed box 2, folder "City Design Research," Lynch MSS.

[212] Wetmore, "Visual Approach," 30.

any given proposal can be judged, and design alternatives can be pursued," means which conveyed "the sequential and temporal nature of the highway trip, and may be expressed in diagrams, movies, abstract models, or flip cards."[213]

Indeed, by 1959, the concepts of vision, motion, space, and circulation that had been growing since 1951 manifested in the development of a graphic notation system to chart the visual sequences of the highway experience. In April of 1959, Lynch summarized the progress on the project and announced the development of a new system of notation. All the data and raw materials gathered over the course of the authors' studies of urban highways were synthesized to develop "a technique for recording and evaluating these elements as they appear in any given road" that involved "a series of sketches, photographs and motion pictures, as well as a new graphic notation."[214] Lynch also described the various "speculative analyses" undertaken to determine the most important elements of the visual experience of the highway in motion and noted that several urban highways had been studied in various cities.[215] These highways included other roadways in Boston, such as Storrow Drive and Route 2, as well as highways in Connecticut, New York, New Jersey, Philadelphia, and Cleveland.[216] John Myer, for example, prepared an assessment of the approach to New York City via the New Jersey

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[213] Wetmore, "Visual Approach," 31.

[214] Kevin Lynch, "Summary of Accomplishments: Research Project on the Perceptual Form of the City," April 1959, Kevin Lynch Papers, MC 208, PFoC box 1, folder "General Statements (2 of 2)," Lynch MSS, 8-9.

[215] See, for example, the analysis of the approach to New York City over the New Jersey flats in the following: "Thruway," 28 May 1958, Kevin Lynch Papers, MC 208, unprocessed box 4b, folder "Hwy-General Statements," Lynch MSS. Although this text is unauthored, it is possible that it was written by Myer, as he had done significant research on this portion of urban roadway and the wording aligns with a letter he wrote to Lynch discussing this same stretch of road. See Letter, Jack Myer to Kevin Lynch, n.d., Kevin Lynch Papers, MC 208, unprocessed box 4b, folder "Hwy-General Statements," Lynch MSS.

[216] Appleyard, Lynch and Myer, *View from the Road*, 27.

flats on the New Jersey Turnpike and contributed to the philosophy of the effects of space, motion, and orientation that later appeared in the book.[217] These roads were recorded through a combination of film, photography, subjective descriptions, and rapid sketches.[218]

Thiel at Berkeley: Working Papers and Basic Notational Form

At the same time that the MIT Team was developing their notation research in their "Imageability study of the highway" in the late 1950s, Philip Thiel, who had been an important early part of the early work at MIT, undertook a similar endeavor at the University of California, Berkeley. Thiel spent six years teaching at Berkeley, first as an instructor from 1954-56 and then as an assistant professor from 1956-60.[219] Following his summer work at MIT, Thiel returned to Berkeley to continue teaching and exploring

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[217] See Letters, Jack Myer to Kevin Lynch, n.d.; and Donald Appleyard to Kevin Lynch, n.d; both located in Kevin Lynch Papers, MC 208, unprocessed box 4b, folder "Hwy-General Statements," Lynch MSS. This correspondence reveals significant interchange of ideas on the power of motion, space, and orientation on the shaping of the highway experience, in the context of their as yet unpublished research project. Although the letters are undated, Appleyard writes in his that he is living in Berkeley, which, according to his biographical statement, occurred in 1959 when he went to work for DeMars/Reay architects. Since Appleyard wrote his letter to Lynch with Myer's letter as an enclosure, both can be dated to circa 1959-1960, the period of time in which Appleyard was living in Berkeley (the next time he moved to Berkeley was in 1967, long after the book had been published). See "University of California Biography for Academic Personnel, Donald Appleyard, Berkeley Campus, Landscape Architecture Department," 1 January 1983, Folder "Appleyard, Donald, 1983," Box 14, Lynch MSS, 2.

[218] Lynch, "Summary of Accomplishments," April 1959, Lynch MSS, 8-9.

[219] Thiel described the atmosphere at Berkeley as one that was conducive to developing new ways of thinking about and approaching architecture, due in large part to the influence of the newly-appointed Dean of Architecture, William Wurster. When Wurster left MIT to join Berkeley as Dean in 1950, the school of architecture was, in Thiel's words, essentially a Beaux-Arts school. Wurster approached the task of updating the school from the nineteenth to the twentieth century by inviting internationally-renown designer Charles Eames to develop the first-year program. Thiel worked with Eames as one of the assistants charged with implementing his programs. At the same time, Wurster sought to invigorate the department, according to Thiel, by hiring new faculty willing to think outside the Beaux-Arts box. See Thiel, interview and Thiel, "Ham on Wry," 2-3.

the implications of his senior thesis project at MIT.[220] A grant from the Faculty of the College at Berkeley during the summer of 1957 allowed Thiel to focus on developing a methodology to study visual representation. This was followed, during the spring of 1958, by a partial teaching appointment and time to pursue his work as an assistant research architect. In a progress report from June 1958 titled "A Study of the Visual Representation of Architectural and Urban Space-Time Sequences," Thiel described the work he had accomplished during the previous semester and tied together all the ideas he had developed at that point on representing spatial sequence.[221] Although the report did not develop the notational form itself, it did represent Thiel's first attempt at providing a thorough conceptual background or framework for his own research. Not only did he present an in-depth analysis of the conceptual precedents of music, dance, and film, but he also noted the work of others who had studied the sequential nature of experience, such as architect Ernö Goldfinger, scientist James J. Gibson, and filmmaker Sergei Eisenstein, building on the early discourse at MIT on movement, perception and urban form.[222] Thiel was interested in exploring and expanding upon the various ways artists, architects, and filmmakers had responded to the problem of sequential urban representation, from the linear perspective of the Renaissance to the Cubists' concurrent

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[220] Thiel, interview and Clair Enlow, "Design's ultimate clients, the users, are often forgotten," *Seattle Daily Journal of Commerce*, Wednesday, August 15, 2001.

[221] Philip Thiel, "Progress Report, June 1958: A Study of the Visual Representation of Architectural and Urban Space-Time Sequences" (photocopy, University of California, College of Architecture, Berkeley, 1958).

[222] Thiel cited from Goldfinger's article on "The Sensation of Space" published in *Architectural Review* in 1941, Gibson's *The Perception of the Visual World* of 1950, and Eisenstein's *Film Form / The Film Sense*, published in English in 1957. His extensive bibliography also included two articles written by Halprin, including "Choreography in the Landscape" of 1955 and "Structure and Garden Spaces Related in Sequence" of 1958, as well as a 1958 unpublished draft report of Lynch's "Image of the City," and two of Kepes's books – *The Language of Vision* of 1944 and *The New Landscape in Art and Science* of 1956 (Thiel, "Progress Report," 27-28).

depiction of adjacent surfaces and the Futurists' simultaneous presentation of successive events.[223]

In several unpublished departmental working papers from 1959 and 1960, later referred to as "Space Script Studies," Thiel slowly began to work out the form of an architectural notational system. In a working paper from June 1959, titled "Anatomy of Space," describing the building blocks of spatial experience in terms of volumes, surfaces and objects, their positions, their degrees of enclosure, and their relative scale.[224] Thiel noted that he believed his explication of an anatomy of space to be one of his greatest accomplishments and the equivalent of writing *Grey's Anatomy* for the medical profession. Thiel believed that before architects could talk intelligently and precisely about space, they had to truly understand the elemental properties of space and have a way of describing them exactly.[225] In August of 1959, Thiel prepared two more papers, one of which remained within the department as an unpublished piece and another of which was prepared as part of a larger study being undertaken by two of his colleagues. The former, "The Experience of Space and Movement," consisted of an assembly of 10 descriptions of sequential journeys taken from literature by authors such as Philip Johnson and Lawrence Halprin. Thiel analyzed these descriptions for references to space-establishing elements; spatial characteristics such as color, size, value, direction, and texture; and observer qualities such as rate of travel, direction, and position. Thiel tabulated the references in each description and presented his findings in a chart,

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[223] Thiel, "Progress Report," 8-12.

[224] Philip Thiel, "The Anatomy of Space" (working paper, University of California, College of Architecture, Berkeley, 1959).

[225] Thiel, interview.

ostensibly to aid him in determining which elements of spatial experience played the largest and most defining roles.[226]

In Thiel's second paper from August of 1959, "The Urban Spaces at Broadway and Mason," he developed a planar method of analyzing sequences of spaces that was written as part of a study being undertaken by Berkeley professors Barclay Jones and Stephen Jacobs on "How Best to Use Existing Architectural Forms in City Design" in San Francisco. Their work sought to determine the social processes that drove a city's decision to either replace or reuse existing architectural structures. As part of their study, Jones and Jacobs included contrasting or alternative approaches to the study of the city; Thiel's focus on developing a language to describe a city's exterior spaces was one such approach. They asked Thiel to survey an area of downtown San Francisco they had already covered in order to provide a control or counterpoint to their own study.[227] Within the area of the city circumscribed by Jones and Jacobs, Thiel selected a four-block section that abutted the intersection of Broadway and Mason. (fig. 2.8) His field analysis consisted of panoramic photographs, contour drawings, building elevations, sequenced photographic series, and field sketches, all of which he used to create an isometric perspective drawing of the entire area (fig. 2.9) as well as eight perspective drawings from viewpoints along a specific journey through the area (fig. 2.10). Each viewpoint identified a major space for further analysis and consisted of three parts: a perspective sketch of the space, a perspective diagram of the same space with its defining elements

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[226] Philip Thiel, "The Experience of Space and Movement" (working paper, University of California, College of Architecture, Berkeley, 1959).

[227] Barclay Jones, forward to "The Urban Spaces at Broadway and Mason: A Visual Survey, Analysis and Representation" by Philip Thiel (working paper, University of California, College of Architecture, Berkeley, 1959) i; Thiel, interview.

represented by basic geometric shapes, and a view from overhead that keyed the viewpoint back to the larger isometric perspective drawing.[228] (fig. 2.11)

Thiel's method of analysis in this paper began with a plan view of the spaces of the journey (read from the bottom of the page upward), in which each of the eight spaces was abstracted as relatively equivalent circular areas that overlapped and extended into one another. (fig. 2.12) The center of the circle located the center of the represented space and the continuity of the circumference represented the degree of explicitness of the defining elements. The space-circles were grouped into the five segments of the journey during which a straight-line path was followed; between each segment, an arrow conveyed the degree of the turn from one to the next. The path through the space-circles was sub-divided into fifty-foot intervals and numbered in the direction of travel. The character of the path line indicated change in grade: black conveyed descent; white, level; shaded, ascent; and cross-hatching, stairs. The net change in grade was given to the left of the path line. The form quality of the space (on a five-step spectrum between O-and X-type) was given by a small circular symbol in the center of the space while views out of the spaces were shown by triangular arrowheads.[229] Although an interesting exercise in spatial representation, it was not a continuous representation of spatial experiences as it focused instead on discrete moments through the journey and was, moreover, rather difficult to interpret.

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[228] Philip Thiel, "The Urban Spaces at Broadway and Mason: A Visual Survey, Analysis and Representation" (working paper, University of California, College of Architecture, Berkeley, 1959) 1-5. Thiel selected his four-block area for its relative unfamiliarity and its inclusion of a variety of spatial forms.

[229] Thiel, "Urban Spaces at Broadway and Mason," 3-5.

In a short working paper from the following month, September 1959, titled "A Proposed Space-Notation," Thiel began to develop a system of symbols that represented degree and type of spatial enclosure, key elements of his later notation system. He showed how various spatial situations could be captured through combinations of symbols overlaid upon a crosshair that represented the straight-ahead gaze of the observer. Thiel illustrated these symbols on a drawing of an urban plaza that included multiple, regular geometric structures. Within the plaza, 10 different viewpoints were highlighted and keyed to the symbol that represented the respective spatial experience.[230] (fig. 2.13) Thiel's engagement with developing a notational system extended to his work in the classroom. In 1959, Thiel taught a course at Berkeley titled the "Visual Representation of Space," in which he asked students to develop their own forms of notation. In a packet of class notes that he distributed to students, he stated, "this study has as its ultimate objective the development of new idioms for the visual representation of architectural and urban space-time sequences. The particular orientation of the study is literally from the viewpoint of the moving observer."[231] He urged his students to develop a system that was not only readily adaptable to the architect, urban planner, historian, and critic, but also dependent on simple and inexpensive tools and media. In fact, throughout his tenure at Berkeley, Thiel challenged students to develop alternative

[230] Philip Thiel, "A Proposed Space Notation" (working paper, University of California, College of Architecture, Berkeley, 1959). In 1959, Thiel also experimented with the creation of a device called a "Triple Vista Integrator" that could aid in the synthesis of space-sequence diagrams through a combination of film projection, stereoscopes, and mirrors. It is unclear whether the device was created, as the only evidence consists of some very rough notes and a drawing of the proposed device. See Philip Thiel, Drawing, "Triple Vista Integrator," College of Architecture, Jan '59, and Philip Thiel, Handwritten notes, "Use 2 mirrors to synthesize diagrams of a space-sequence," both located in Philip Thiel Manuscript Collection, Box A, Folder "Study 6 Sequence Recording, Cinematographic [1959]," Thiel MSS.

[231] Philip Thiel, "Class Notes on the Visual Representation of Space" (photocopy, University of California, College of Architecture, Berkeley, 1959) 21. [Semester number not indicated in the notes.]

methods of describing and surveying space. During the spring term of 1956, Thiel asked a class of upper division architecture students to develop a graphic system for capturing the sensory characteristics of a journey that was based on the structure of musical notation. The channels for depicting the impressions received by various senses were arrayed down the page, similar to the different instruments in a conductor's score, and were coordinated vertically on the same time scale.[232] Similarly, in the fall of 1957 and spring of 1958, Thiel held classes in which ten architecture students were asked to develop abstract, graphic representations of a walk through a sequence of spaces based on a written description of the experience.[233]

Debates on Highway Design of the late 1950s

Thiel's research dealt primarily with recording the experience of the pedestrian and thus highlighted the details that could be observed at walking speed along a single path through the environment. The MIT Team's research, focused as it was on the higher speed travel of the automobile, could incorporate the larger issues of city planning by questioning how the design of the roadway could lend coherence to an entire metropolitan region. Indeed, the visual experience of driving at high speeds around and through the city was a topic of great interest among several notable figures in the field of architecture and planning in the late 1950s. Paul Rudolph, the newly-appointed Chair of

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[232] According to Thiel, although the exercise succeeded in making the students more aware of their environments, the resulting graphic means they developed failed to convey an accurate sense of the sensory experience along their chosen routes. See Thiel, "Progress Report: June 1958," 19.

[233] In this case, Thiel felt that the students successfully created inventive, abstract systems. He noted, however, that the exercise would have been more difficult if the students had to select and describe the defining spatial elements themselves, rather than depend on a description in which these elements were already highlighted. Thiel, "Progress Report: June 1958," 9.

the School of Architecture at Yale University, remarked in 1958 on the "new scale given by the quickly moving vehicle" and exhorted students and designers to relearn and revisit "that art of disposing our buildings to create different kinds of space."[234]

That same year, San Francisco-based landscape architect Lawrence Halprin wrote of the need to incorporate an understanding of movement into the design of the urban landscape. As he argued, "Parkway design must recognize this element of rapidity of movement along its roadbed by a design which is related to the quickly moving person."[235] In this article, titled "High Speed Parks," he wrote that the techniques of landscape design geared toward the slowly strolling pedestrian would be lost at the higher speeds of the automobile. It was not enough to design for movement, but to design for the speed of movement as well.[236] In this brief article, Halprin left many questions unanswered, including how designers should approach parks that would be experienced through multiple modes of travel – not only pedestrians and automobile drivers, but also cyclists, runners, and potentially even horseback riders.[237]

In the same year, in *Progressive Architecture*, Halprin wrote about the intimate experience of walking through his own family's house and garden near Mt. Tamalpais in Kent Woodlands, California, which was one of his many collaborations with architects

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[234] Paul Rudolph, "Architecture: The Unending Search," *Yale Alumni Magazine* 21 (May 1958): 8-11. Although travel by car offered new and exciting vistas for the driver in the twentieth century, it is important to note that the advent of the railroad provided similarly new experiences of speed and changing vistas in the nineteenth century. See Wolfgang Schivelbusch, *The Railway Journey: The industrialization of time and space in the 19th century* (Berkeley: The University of California Press, 1977).

[235] Lawrence Halprin, "High Speed Parks," *Architectural Forum* 108 no. 5 (May 1958): 172.

[236] Halprin, "High Speed Parks," 174.

[237] Halprin would begin to address such questions in his book of 1966, *Freeways*. See Chapter 6 for more on this text.. [Lawrence Halprin, *Freeways* (New York: Reinhold Publishing Corporation, 1966)].

Wurster, Bernardi & Emmons.[238] In this article, titled “Structure and Garden Spaces Related in Sequence,” Halprin described the property as a walk through its spaces, pairing the text with a series of photographs that evoked the experience of progression.[239] He did not simply describe the spaces; he attempted to give the reader a sense of how it would feel to experience the spaces by noting the impact and direction of views, containment and exposure, and texture and sequence: “This entrance garden is a space confined on three sides by walls, formed by the fence at the entrance, a 25’ vertical-cut bank on the left, and the two-story element of the house ahead. But the space explodes outward to the view on the downhill side…. [The] garden is paved in red brick and the trunks of birch form a sequence of space markers along its edge.”[240] Although he was not engaged in the development of a notation at this time, the themes of movement, space, and sensory experience – at the speed of the pedestrian as well as the automobile – so evocatively described in Halprin’s early work, continued to define his writing and theory as his professional practice began to develop and expand over the remainder of the decade.[241]

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[238] William Wurster had been the Dean of Architecture at MIT before moving to the University of California, Berkeley, to take over the leadership of Berkeley’s School of Architecture and open his own professional practice. See Marc Treib, ed., *An Everyday Modernism: The Houses of William Wurster* (Berkeley: University of California Press and The San Francisco Museum of Modern Art, 1995), n.p.

[239] This approach, which emphasized spatial sequence from the point of view of the moving observer, foreshadowed the one Halprin would later take in his studies on Motation. At this point, however, Halprin used a narrative prose style in combination with imagery to convey a similar effect.

[240] Lawrence Halprin, “Structure and Garden Spaces Related in Sequence,” *Progressive Architecture* 39 no. 5 (May 1958): 96.

[241] Lawrence Halprin, “Hill Garden: The Importance of Edge,” *Landscape Architecture* 50 no. 2 (Winter 1959-1960): 96-99; Lawrence Halprin, “Landscapes between walls,” *Architectural Forum* 111 no. 5 (November 1959): 149-153; Lawrence Halprin, James C. Rose, and Karl Linn, “Houses and Landscapes,” *Progressive Architecture* 41 no. 5 (May 1960): 140-143. Halprin began to substantively address the tension between designing for the pedestrian versus the automobile in his later texts of the 1960s, particularly *Freeways* in 1966 (see Chapter 6).

While the MIT Team and other notable figures such as Paul Rudolph and Lawrence Halprin were enamored by the potential of visually redesigning the highway, others were becoming more and more outspoken about the detrimental social and economic effects of urban highway design and construction. At the same time that Halprin was extolling the virtues of parks designed for the automobile, cultural critic Lewis Mumford was criticizing the highway design approach that placed automobiles before pedestrians. In an article from April 1958 titled "The Highway and the City," Mumford attacked highway engineers for their "brutal assaults against the landscape and against the urban order."[242] In single-minded pursuit of increased traffic volumes, higher speeds, and longer distances, the highway engineer "does not hesitate to lay waste to woods, streams, parks, and human neighborhoods in order to carry his roads straight to their supposed destination."[243] Instead of perpetuating a "cycle of congestion" whereby more high-speed roads were jammed through already overcrowded cities,[244] Mumford recommended that the freeway be built around the city, where it could delineate a greenbelt or circumscribe a boundary between high- and low-density buildings.[245] Mumford urged designers to consider investing in smaller, electrically-powered cars, mass transportation, and the design of pedestrian-accessible city centers.[246]

Indeed, although various civic, educational, commercial, and transportation projects were created through the urban renewal and highway construction programs of

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[242] Lewis Mumford, "The Highway and the City," *Architectural Record* 123 no. 4 (April 1958): 181.

[243] Mumford, "Highway and the City," 181.

[244] Mumford, "Highway and the City," 182.

[245] Mumford, "Highway and the City," 183.

[246] Mumford, "Highway and the City," 185-186.

the 1950s, they were realized at immense human cost through processes of large-scale clearance that have been derided as elitist, racist, and inhuman. As the projects progressed, citizen opposition began to mount, most notably against the massive urban highway construction programs of the 1950s. Despite the fact that the federal government's generous 90/10 funding program did not appear until 1956, whereby states were responsible for only 10% of the total cost of construction, many states had begun to engage in serious and sustained regional highway planning much earlier.[247] By the mid-1950s, major urban highways were under construction in New York, California, and Massachusetts. In Manhattan, for example, the local residents of Washington Square Park protested the construction of a proposed freeway in the early 1950s that would have cut directly through the park.[248] Led by local activist Shirley Hayes, a group of women who called themselves the "Washington Square Committee" successfully petitioned between 1952 and 1958 to not only ban all traffic through the park but also cancel the proposed widening of the streets around the square.[249] In 1959, the citizens of San Francisco mounted such strong protest against the state's plans for the Embarcadero highway that the city's Board of Supervisors voted to immediately halt freeway construction.[250] In Boston, although the entirety of the Central Artery opened in 1959,

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[247] Scott, 586.

[248] For more, see Robert Fishman, "Revolt of the Urbs: Robert Moses and his Critics," in *Robert Moses and the Modern City: The Transformation of New York*, ed. Hilary Ballon and Kenneth T. Jackson, 122-129 (New York: W. W. Norton & Company, 2007).

[249] Fishman, "Revolt of the Urbs," 123-125.

[250] Over the following six years, the conflict between the city and the state over highways in San Francisco became so heated and insoluble that the state's freeway plans were effectively stymied. Frieden and Sagalyn, 45 and Katherine M. Johnson, "Captain Blake versus the Highwaymen: Or How San Francisco Won the Freeway Revolt," *Journal of Planning History* 8 no. 1 (February 2009): 63. The issues

the remainder of the proposed Inner Belt was never built. By the time the plans for the full circumferential highway officially came to the construction table in the 1960s, city residents and institutions had organized so strongly against it that the plans were dropped.[251] Over the course of the 1960s, similar protests developed in cities such as Baltimore, Seattle, and San Antonio and highway construction projects were halted due to citizen protest in cities such as Philadelphia, Miami, and New Orleans. By the mid-1960s, these protests were recognized as a national movement by the press and given the moniker, "freeway revolts."[252]

Many of the American highways built in the mid-twentieth century suffered in comparison to their earlier parkway counterparts and were often criticized for not only causing unnecessary damage to the urban fabric and natural landscapes and resources, but also for lacking in aesthetic beauty.[253] Indeed, the potential to affect large-scale urban design through highway construction stimulated significant debate in the field of highway planning from the 1940s through the 1960s. The aesthetic component of these debates revolved around the possibilities of combining engineering safety, utility, and economy

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surrounding San Francisco's urban renewal and highway construction programs and Lawrence Halprin's work for the California Department of Highways is discussed in detail in Chapter 4.

[251] Despite the fact that several of the radials specified in the plan of 1948 were completed, including the Northeast and Southeast Expressways, the plan's central element of the Inner Belt never came to fruition. In fact, by 1970, opposition to highway construction had reached such a high level that that the governor of Massachusetts declared a moratorium on all new freeway projects. Banerjee and Southworth, *City Sense*, 315; and Brenda Bushouse, "Changes in Mitigation: Comparing Boston's Big Dig and 1950s Urban Renewal," *Public Works Management and Policy* 7 no. 1 (July 2002): 56. For a discussion of the citizen protest organized in opposition to the Cambridge portion of the Inner Belt, see Chester Hartman, *Between Eminence and Notoriety: Four Decades of Radical Urban Planning* (New Brunswick, NJ: Center for Urban Policy Research, 2002), 19.

[252] Frieden and Sagalyn, 45.

[253] Gilmore D. Clarke, "The Parkway Idea," in *The Highway and the Landscape*, ed. W. Brewster Snow, 33-55 (New Brunswick, NJ: Rutgers University Press, 1959) 33-43.

with visual beauty, resource conservation, and landscaping. The concept of "The Complete Highway," initially developed in 1943 by the Highway Research Board (HRB), received increased attention in highway engineering circles by the late 1950s as a valid approach to improving the quality of roadway design. The Complete Highway concept could be applied equally to all high-speed roadways, regardless of location (rural or urban), function (freeway or toll road) or scale (local or state) and sought to address the four requirements of utility, safety, beauty, and economy.[254] In 1959, W. Brewster Snow, a civil engineer, edited a book titled *The Highway and the Landscape* that extolled the virtues of the Complete Highway and contained essays by "leading practitioners of the art of modern highway design"[255] who hailed from the fields of engineering, landscape architecture, and economics. In the first chapter, titled "The Complete Highway," written by Snow and fellow civil engineer William A. Bugge, the authors described the characteristic of beauty in the following terms: "An essential part of the complete highway, [beauty] requires the harmonious integration of engineering, architectural, and landscape techniques. Conservation of stream banks, fine trees, weathered rock ledges, and similar natural features is essential to the attainment of beauty on the finished highway. A well-located highway with a streamlined, erosion-proof cross-section, and with well-designed structures, has pleasing and long-lasting qualities."[256] For Snow and Bugge, therefore, a beautiful highway was one that followed a pleasing path through natural scenery.

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[254] Spencer Miller, Jr., "Foreword" to Snow, *Highway and the Landscape*, xi-xii, xi.

[255] Miller, "Foreword," xii.

[256] Bugge and Snow, 27.

The concept of beauty was addressed more fully in another of the book's essays, titled

"The Art of Fitting the Highway to the Landscape" and written by civil engineer F. W. Cron. Cron encouraged engineers to sense "the large sweep of the topography, without becoming bogged down in the small details," adjusting the length of straight-line segments and the degree of curvature to create more pleasing visual forms and shapes.[257] Ultimately, the good designer would "see the relationship between the alignment, the grade, and the earth's surface, and thus visualize the road in the third dimension."[258] Among other recommendations, he wrote: "Avoid little local dips in an otherwise long, uniform grade," or, "a very satisfactory appearance results when vertical and horizontal curves coincide," and finally, "a disjointed effect occurs when the beginning of a horizontal curve is hidden from the driver by an intervening summit while the continuation of the curve is visible in the distance beyond."[259] Although Cron encouraged engineers to consider the value of an alternate scenic route if it was equivalent in engineering and economic value, he was careful to note that "this does not mean that the road should be forced arbitrarily into unnecessary curves simply to make it curving 'for art's sake,' Far from it!" Rather, he encouraged the designer to find topographic features or landmarks that could "influence the centerline and cause it to curve right or left in a natural manner."[260] Cron's concept of beauty was thus based in the creation of proper

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[257] F. W. Cron, "The Art of Fitting the Highway to the Landscape," in Snow, *Highway and the Landscape*, 78-109, 107.

[258] Cron, 108.

[259] Cron, 95-105.

[260] Cron, 91. See also Kemp, 773-777 for discussion of Cron and The Complete Highway.

horizontal and vertical alignments such that the driver's experience was as safe and predictable as possible without being monotonous.

However, the issue of applying The Complete Highway to highways of the urban realm was largely absent in the writings of Snow, Bugge, and Cron in *The Highway and the Landscape*. Its only mention appeared in "The Parkway Idea," an essay written landscape architect and engineer Gilmore D. Clarke, and concerned integrity of land use rather than visual effect. Clarke recommended that urban expressways not bisect established neighborhoods or homogenous areas, but rather follow pre-existing boundaries between various land-uses and avoid small neighborhoods entirely. Circumferential highways, he asserted, should be built along the parkway model and restricted to passenger-type vehicles to minimize urban disruption.[261] By calling attention to the importance of studying and respecting the integrity of prior land-use, Clarke addressed one of the most significant criticisms of urban highway construction of the time.

The Highway as Path in Lynch's *The Image of the City*

In 1960, six years after the inception of the PFoC Study and four years after beginning his "imageability study of highways," Kevin Lynch, who was still teaching at MIT, published a landmark book of urban design titled *The Image of the City*. (fig. 2.14) In this book, Lynch reported on the extensive body of fieldwork gathered over the course of the PFoC Study that examined the visual characteristics of American cities – specifically Boston, Los Angeles, and Jersey City – as perceived by their inhabitants.

[261] Clarke, 52-53.

Lynch carried out two separate studies within a circumscribed downtown area of each of these three cities. In one study, Lynch organized in-depth interview of a small number of city residents in order to understand how they mapped their physical environments. In the other, Lynch recorded systematic field observations regarding the visibility, imageability, and interconnections of various visual elements, based on subjective judgment.[262] He examined the apparent clarity and legibility of the urban landscape, noting those aspects of the physical environment that served to structure the image of a given city in the minds of its users. For Lynch, an imageable city was one "whose districts and landmarks or pathways are easily identifiable and are easily grouped into an over-all pattern."[263] In such a city, the resident could easily move and orient himself and be encouraged to participate through a rich choice of routes and destinations.[264] Central to Lynch's analysis was the understanding that urban design was a construction in space as well as time: the image of the city was developed over the course of time and through the act of moving through its pathways, an approach that defined most of the course of the PFoC Study.

Over the course of the study, Lynch observed that the elements that were most often pointed out or described by the interviewed residents in each city could be grouped into five elements: paths, edges, districts, nodes, and landmarks.[265] For Lynch, the path

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[262] The research undertaken by Lynch in Boston, Jersey City, and Los Angeles was, in each case, restricted to a central area of approximately 2 ½ by 1 ½ miles within each downtown. Lynch, *Image of the City*, 14-45.

[263] Lynch, *Image of the City*, 3.

[264] Lynch, *Image of the City*, 1-13.

[265] These five city elements were later used in *The View from the Road* as part of the Orientation diagram (see Chapter 4).

– a channel along which an observer “customarily, occasionally, or potentially moves”[266] – was one of the most defining elements of the city image, a belief that reflected his increasing focus on the study of highways and circulation over the course of the 1950s. For Lynch, the most successful paths addressed and incorporated a series of visual-perceptual characteristics, including spatial qualities of width or narrowness, the visual exposure or connection from the path to other parts of the city, the gradient of directional intensity while traversing a path, and clear visual cues at origin and destination points to create a sense of arrival and departure. Patterns of plantings and facades, sequences of buildings types, and the rhythm of setbacks along a path could increase the sense of continuity.[267] The directional orientation of the street, strengthened by clear termini, gradients of direction, or visual exposure to goals further along the path, gave it a sense of progression that differentiated one direction of travel along the street from the other.[268]

The way that the path came together with the four other elements of the city image (the edge, node, district, and landmark)[269] was essential for the production of a clear and coherent city image: “The paths… are given identity and tempo not only by their own form, or by their nodal junctions, but by the regions they pass through, the

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[266] Lynch, *Image of the City*, 46.

[267] Lynch, *Image of the City*, 50-57.

[268] Lynch, *Image of the City*, 97-98.

[269] Edges were linear elements that acted as lateral references; edges could not be used as paths because they delineated some kind of uncrossable boundary, seam or break in continuity. Nodes were points where multiple elements came together, serving as points of intensive focus where the traveler was forced to make some kind of decision. A node could be a junction, a crossing of paths, a break in transportation, or a location of concentrated use such as an urban plaza. Lynch, *Image of the City*, 47, 72-73. The district, although not spatially enclosed, was perceived as an enterable section of the city with a relatively consistent character defined by factors such as texture, detail, symbol, building type, and topography. Lynch, *Image of the City*, 47, 67. The landmark was a single-point reference like the node, but that did not comprise an inhabitable space; they were basic physical structures or objects that stood out against a background composed of multiple other objects. Lynch, *Image of the City*, 48.

edges they move along, and the landmarks distributed along their length."[270] "It is the total orchestration of these units which would knit together a dense and vivid image and sustain it over areas of metropolitan scale."[271] The city was perceived over time; the designer's job was to design with an awareness of how the various elements of city would be experienced within their surrounding context as part of a larger sequence.[272] The elements became events in the journey through the cityscape, which in turn gained meaning as an experience on its own.[273] Ultimately, Lynch suggested, "one could imagine that there might be a way of creating a *whole* pattern, a pattern that would only gradually be sensed and developed by sequential experiences, reversed and interrupted as they might be."[274] It is interesting to note that Lynch purposely excluded a discussion of the perceived or communicated meaning of city form in his book, choosing to focus solely on visual concerns. Although this approach grew from the structure of the PFoC study, whereby Lynch agreed to focus his study on the visual and Kepes directed his attention toward urban communication and meaning, it necessarily limited the scope and application of Lynch's book to the field of urban design on the whole.

A year after the book was published, a review in the *Journal of the American Planning Association* written by David Crane stated that *The Image of the City* was

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[270] Lynch, *Image of the City*, 85.

[271] Lynch, *Image of the City*, 108.

[272] Lynch, *Image of the City*, 109.

[273] Lynch, *Image of the City*, 97.

[274] Lynch, *Image of the City*, 115. Thus, the attempt to organize, structure, and identify one's surroundings was a constant and mutating process. The image of a city, therefore, had to be equipped to handle flexibility and change, not only to account for future contingencies, but also to allow each individual to use the basic elements to construct an image tailored to his or her own mental constitution. Lynch, *Image of the City*, 90, 91.

"packed with abstract ideas which will have tremendous value for the urban design disciplines. This work… is the contribution, not of an architect-turned-planner, but of an interdisciplinary thinker who defies classification. Therein lies much of the great appeal of his book to the entire planning profession."[275] Over the following years, Lynch's book became a classic in the field of planning and garnered both national and international acclaim.[276] Indeed, more than a decade after the book's initial publication, *New York Times* architecture critic Ada Louise Huxtable referred to Lynch as "the man whose analysis of the form and functions of cities has become a cornerstone of much of the basic planning philosophy of our time."[277] Although *The Image of the City* was a significant publication for Lynch, and perhaps the book for which he is most well-known, it is important to note that his research on the visual form of cities was only one part of his larger research agenda during the 1950s. The publication of *The Image of the City* was undoubtedly a milestone, not only in Lynch's career, but also in the PFoC study, as it brought much of the study's research and conclusions to international attention. It began to address Lynch's research into what he described as the most formative element in city design – the path – and analyzed its potential in the formation of the city image and reflected his interest in the "imageability" of highways. This approach was defined in part by the local atmosphere of large-scale urban renewal and highway construction in

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[275] David A. Crane, "Book Review: Image of the City by Kevin Lynch," *Journal of the American Planning Association* 27 no. 2 (1961): 152-153. As he notes in the review, Crane was "an assistant in charge of the first of four years' study leading up to *The Image of the City*." Crane, 153.

[276] In 1998, *Image of the City* was already in its twenty-sixth printing. Banerjee and Southworth, *City Sense*, 5.

[277] Ada Louise Huxtable, "Lessons in How to Heal the City's Scars," *New York Times*, May 27, 1973, 19.

Boston and the national context of burgeoning debate on the visual potential of the urban highway.

Debates on Highway Design of the early 1960s

At the same time that Lynch published his *The Image of the City*, regional planner Boris Pushkarev began to publish a series of articles and essays that focused on the issue of highway form and aesthetics. One of the best-known and oft-cited planners of the time on the subject of highway design, Pushkarev was a Senior Planner at the Regional Plan Association of New York City. Between 1960 and 1962, Pushkarev published an article in the journal *Landscape* as well as two major articles in Highway Research Board publications.

In his first article in *Landscape*, published in 1960 and titled "The Esthetics of Freeway Design," Pushkarev argued that the visual/aesthetic form of the highway had garnered little attention and received only passing mention in handbooks of engineering.[278] He wrote: "The moving eye perceives the form of the highway not as an engineering problem, but as an esthetic entity, a piece of sculpture or architecture"[279] and emphasized the primacy of the formal, visual approach. The sculptural quality of the "two undulating ribbons of pavement," grew from the harmony, rhythm and proportion of the pavement's curves, as well as the vistas presented to the traveler.[280] The form of the highway could be molded as abstract spatial composition that is actively experienced by

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[278] Boris Pushkarev, "The Esthetics of Freeway Design," *Landscape* 10 no. 2 (Winter 1960-61): 7-15

[279] Pushkarev, in *Landscape*, 8.

[280] Pushkarev, in *Landscape*, 9.

the driver, "who experiences visual as well as kinesthetic sensations of tilting, turning, dropping, and climbing."[281] When constructed in the city, Pushkarev noted that the freeway should be designed such that it maintained its own integrity and visual momentum, forging a strong path through the urban fabric rather than turning aside arbitrarily for small obstacles.[282] Pushkarev recommended the comprehensive integration of traffic engineering and land-use planning into a visual and physical synthesis, insisting upon an equal role for visual form in the determination of highway design. The incorporation of dramatic surprise could be achieved through coordination with strong visual landmarks, distant vistas, and changing axes of sight.[283]

In Pushkarev's next two articles, both published in HRB sources, he introduced the concepts of internal and external harmony in highway design. In "Esthetic Criteria in Freeway Design," published in the *HRB* Annual Meeting *Proceedings* of 1962,[284] Pushkarev wrote that these concepts arose from "methods of formal esthetic analysis…. The former concerns the roadway as an abstract ribbon in space. The latter concerns its relationship with the environment."[285] Internal harmony grew from "continuity of alignment, three-dimensional coordination, and harmony of enclosed areas," while external harmony was based on "integration with the macroenvironment and the microenvironment, definition of elements, and frequency and progression of focal

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[281] Pushkarev, in *Landscape*, 9.

[282] Pushkarev, in *Landscape*, 12.

[283] Pushkarev, in *Landscape*, 15.

[284] Boris Pushkarev, "Esthetic Criteria in Freeway Design," *Proceedings of the 41st Annual Meeting of the Highway Research Board* (1962) 89-108.

[285] Pushkarev, in *Proceedings*, 89.

points."[286] One of the most important elements in internal harmony was the perspective view of the roadbed ahead, as the dominant visual element of the aesthetic experience of the highway. The roadbed, which was composed of curves and tangents (or straightaways) could be manipulated such that the interrelationships of its elements created an aesthetically pleasing shape.[287]

While Pushkarev's article in *Proceedings* addressed primarily the internal harmony of the highway, his article in *Highway Research Record* considered mainly the highway's external harmony. In this article of 1963, titled "Highway Location as a Problem of Urban and Landscape Design,"[288] Pushakarev wrote that external harmony depended on the synthesis of the freeway form and the environmental structure: "A freeway cannot be aesthetically satisfying unless it looks as though it belongs where it is put. It should not look like a foreign body in the landscape or cityscape. To achieve this effect, the planner must sense the dominant visual order in its environment, and inscribe the freeway into this order."[289] In the urban order, the choice between elevated or depressed design depended on the pre-existing street grid, the type of boundary delineated by the route, and the types of spatial enclosures abutting the highway. Pushkarev recommended a wide right of way even in urban situations, to allow for landscaped parkland and the incorporation of greenery into the urban core.[290] Later this

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[286] Pushkarev, in *Proceedings*, 89.

[287] Pushkarev, in *Proceedings*, 90.

[288] Boris Pushkarev, "Highway Location as a Problem of Urban and Landscape Design," *Highway Research Record* no. 23 (1963): 7-18.

[289] Pushkarev, in *Highway Research Record*, 11.

[290] Pushkarev, in *Highway Research Record*, 16-18.

year, Pushakarev co-edited a book with landscape architect Christopher Tunnard, titled *Man-Made America: Chaos or Control?*, in which he gathered together many of the concepts presented in his articles of the early 1960s.[291]

Between 1961 and 1962, when New York-based Pushkarev was generating interest in highway planning and engineering circles for his theories of aesthetic highway design, another New Yorker, Jane Jacobs, published her own account of urban renewal and highway construction in a seminal text of 1961, *The Death and Life of Great American Cities*.[292] Like Mumford before her, Jacobs attacked the technique of urban highway design that sought to relieve congestion by increasing urban highway construction. She noted that more roads simply resulted in more automobiles and did little to alleviate traffic or overcrowding in the urban core. Instead, she pointed to Shirley Hayes's success in petitioning to ban traffic from Washington Square Park and wrote that while urban roadway construction was necessary, it did not always require the highest speeds or the largest roadbeds.[293] It is interesting to note that the same year in which her book was published, a portion of the land at the edge of her neighborhood of Greenwich Village was designated by the city as blighted and earmarked for redevelopment as a middle-income housing project. Opposition to the project, led in part by Jacobs, grew so fierce that the project was cancelled in 1962, only a year after federal funds were requested for a preliminary study.[294] Although an urban renewal project was successfully

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[291] See Boris Pushkarev, "The Paved Ribbon: The Esthetic of Freeway Design," in *Man-Made America: Chaos or Control?*, ed. Christopher Tunnard and Boris Pushkarev, 157-275 (New Haven and London: Yale University Press, 1963). This text is discussed in Chapter 3.

[292] Jane Jacobs, *The Death and Life of Great American Cities* (New York: Vintage Books, 1961).

[293] Jacobs, *Death and Life*, 360-371.

[294] Frieden and Sagalyn, 49-50.

stymied in this case, citizen protest was often not organized quickly or strongly enough to halt redevelopment, particularly as many victims were rarely aware of their organizational political power. Herbert Gans's account in *The Urban Villagers* of the destruction of the West End neighborhood of Boston in 1962 is a particularly telling account of the local residents' failure to organize in response to the planned project as a result of their disbelief that the city would actually engage in what they saw as reprehensible behavior.[295]

Lynch, Appleyard and Myer were not the only academics in Cambridge, MA interested in the future of highway design in the early 1960s. In 1962, Christopher Alexander, who received his PhD in Architecture from Harvard University, co-authored a Research Report with Marvin L. Manheim titled "The Use of Diagrams in Highway Route Selection: An Experiment," that emerged from work completed at the Civil Engineering Department at MIT. In this report, the authors investigated techniques of aerially and topographically mapping the landscape in order to determine the optimum location for new highways by conveying land uses and locations of natural resources and natural and manmade landmarks.[296] The authors assembled a list of twenty-six requirements that they believed should determine highway route location, from earthwork costs, comfort, and safety to air pollution and weather effects.[297] A given region was mapped for each of these requirements and an amalgamated map was created that

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[295] Herbert Gans in *The Urban Villagers: group and class in the life of Italian-Americans* (New York: Free Press of Glencoe, 1962), 281-304.

[296] Christopher Alexander and Marvin L. Manheim, *The Use of Diagrams in Highway Route Location: An Experiment* (Cambridge, MA: Massachusetts Institute of Technology Department of Civil Engineering and Civil Engineering Systems Laboratory, 1962).

[297] Alexander and Manheim, *Use of Diagrams*, 5, 31-88.

combined all twenty-six factors into one.[298] This mapping technique, which depended on the combination of subjective pencil sketches, would have been of relatively little use but other techniques emerged later in the decade that depended on topographical and site data.[299]

Alexander and Manheim continued to research these issues and Alexander in particular went on to develop intricate techniques of urban design and analysis over the following years. [300] They published their comprehensive approach to planning in the same year that the Federal-Aid Highway Act of 1962 was signed into law, which for the first time sought to integrate highway planning into a more comprehensive municipal and regional approach. This act stated that any federal aid to urban highway construction programs was contingent upon integration with an ongoing and comprehensive transportation plan involving both state and local authorities. The passage of the 1962 act thus initiated the formation of both statewide planning authorities and regional/metropolitan planning agencies in localities across the country. Even cities such as New York and Boston, which had already implemented ambitious transportation plans, engaged in significant new regional and comprehensive transportation studies following

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[298] Alexander and Manheim, *Use of Diagrams*, 89-96.

[299] Research on techniques of highway route location intensified in the later 1960s: see, for example Wallace, McHarg, Roberts and Todd, *A Comprehensive Highway Route Selection Method, Applied to I-95 between the Delaware and Raritan Rivers, New Jersey* (1965); and Ian McHarg, "Where Should Highways Go? Comprehensive Route Selection Method Gets Most Social Benefit at Least Social Cost," *Landscape Architecture* 57 (April 1967): 179-181.1

[300] See Christopher Alexander and Marvin Manheim, *The Design of Highway Interchanges* (Cambridge, MA: Massachusetts Institute of Technology Department of Civil Engineering and Civil Engineering Systems Laboratory, 1962). See also Christopher Alexander and A. W. F. Huggins, "On Changing the Way People See," *Perceptual And Motor Skills* 19 (July 1964) 235-253; Christopher Alexander, *Notes on the Synthesis of Form* (Cambridge, MA: Harvard University Press, 1964); and Christopher Alexander, *A Pattern Language: Towns, Buildings, Construction* (New York: Oxford University Press, 1977).

the act's passage.[301] The design of the urban highway received particular attention at various interdisciplinary conferences during this time, establishing urban highway design as its own legitimate field of study and expertise.[302] A conference on Freeways in the Urban Setting was held in Hershey, PA in 1962 and sponsored by the Bureau of Public Roads and the Automotive Safety Foundation. At the conference, the group of delegates, which included Donald Appleyard, acknowledged the advances made in cooperative land-use planning and examined the potential role of highways in urban design itself, discussing topics such as "What Can Be Done To Improve Urban Freeways As They Effect The General City Plan?" and "Important Factors in the Location, Design and Amenities of Urban Freeways."[303]

Thus, over the course of the late 1950s and early 1960s, significant debate and professional discussion in multiple fields was stimulated over the visual form and aesthetic potential of the highway. At the same time, major figures such as Rudolph, Halprin, and Pushkarev, as well as the MIT Team of Lynch, Appleyard and Myer, were stimulated and motivated by the potential of visual and aesthetic design at highway speeds of travel. Even noted Dutch architect J.B. Bakema pointed out in 1962 the need to better understand the issue of rhythm in visual perception from the highway:

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[301] Scott, 585-586 and Johnson, *Laws That Shaped America*, 284.

[302] It is interesting to note that even before the Interstate Highway Act of 1962 made federal funding for highways contingent upon integration with a comprehensive plan, engineers, planners, and architects had already attempted to come together in various ways on the issue of highway planning and design. In 1958, the First National Conference on Highways and Urban Development was sponsored by the HRB and attended by not only engineers, but also city planners and delegates from the American Institute of Planners. Kemp argues, however, that despite its "conciliatory atmosphere," planners were not seen as equal partners but rather as providers of plans and statistics on urban growth and land-use that the engineers could, in turn, use to do their jobs. Kemp, 782-783.

[303] For more, see Kemp 790-791 and American Society of Landscape Architects, "Freeways in the Urban Setting," *Landscape Architecture* 53 (October 1962): 73-80.

> It becomes a design problem to find a rhythm to relate the high speed vision on the high road to the scale of buildings near that road. One must think about the way the human eye can register the rhythm introduced by buildings of a certain height situated at a certain distance from the road. This rhythm will change if one moves at a lower speed, for then the eye can register buildings of a smaller size, situated at smaller distances apart.[304]

Concurrent with these discussions of rhythm, aesthetics, and visual potential were the realities of urban renewal, highway construction, and the citizen revolt and protest that they began to generate in the 1950s and 1960s. While discussion of aesthetics seems in many ways to be disconnected from these harsh realities, it is notable that many of these would-be aesthetes believed wholeheartedly in the redemptive power of visual urban design to remake the physical landscape, evoke a more pleasing urban experience, and orient the individual to the larger city environment.

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[304] J.B. Bakema, "Some Thoughts About Relationships Between Buildings and Cities," *Ekistics* (August-September 1962): 96. See also Jetteke Bolten, "J. B. Bakema 1914-1981: the built environment seen as spatial narrative," *Dutch Art and Architecture today* no. 10 (1981): 27-36.

CHAPTER 3

Thiel, Japanese Gardens and Shrines, and the Notation of Spatial Movement

In 1959, as the Perceptual Form of the City Study was drawing to a close and Lynch was preparing the manuscript for his book, *The Image of the City* (see chapter 2), Philip Thiel submitted a proposal to do field work in Japan that would allow him to test and perfect his concept for a notation system. In this proposal, titled "A Graphic Notation for the Visual Experience of Space by the Moving Observer," Thiel outlined his goal to create a viable system of notation to capture perceptual space and its associated meanings, particularly because such a tool was lacking in the field. For Thiel, Japan was a particularly relevant location to test his system: not only did the country offer a range of spaces from simple to complex and ancient to modern, but the design process also emphasized a high degree of correspondence between concept, material, and structure. Moreover, the structures were unfamiliar to him in terms of both form and meaning, demanding higher levels of visual and cultural objectivity. He intended to test his notation by using it to model a series of temple approaches and precincts, which he would visit while based in the Kyoto area.[305]

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[305] In his proposal, Thiel noted that the 9-month trip would be divided into 3 months in Tokyo to become familiar with sites and develop contacts, followed by the remainder in Kyoto. Philip Thiel, "A Graphic Notation for the Visual Experience of Space by the Moving Observer" (working paper, University of California, College of Architecture, 1959) 1-2.

Thiel spent the academic year of 1959-1960 teaching at Berkeley and then took leave in order to depart for Japan following the spring semester of 1960. He obtained a travel grant from the American Institute of Architects that allowed him to spend 12 months in Japan (followed later by a three-month extension), along with his Japanese wife, Midori, and two young children.[306] He spent the majority of his time in Kamakura, south of Tokyo, but scheduled regular trips to shrines and gardens over the course of his fifteen-month stay in order to field-test his burgeoning sequence notation. After three months in Japan, Thiel wrote: "My experience in Japan has so far completely justified my reasons for continuing the work here. Not only have I gained a new respect for dimension, scale and space in the lower end of the range; and encountered space-forms of a subtlety and complexity that I have not seen in Europe; but the combination of this really different culture and my 'blindness' to its written language has forced me to concentrate on the non-verbal, visually-expressive aspects of the man-made landscape."[307]

Over the following four months, Thiel prepared the first draft of a proposal for his notation and distributed it to various colleagues for critique and commentary.[308] Thiel noted that his notation was "largely untested" and "based on a number of intuitive,

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[306] Thiel, "Ham on Wry," 3.

[307] Philip Thiel, "Interim Report; July, 1960," 3-4, private collection of Philip Thiel.

[308] See Philip Thiel, "A Sequence-Experience Notation for Architectural and Urban Spaces" (working paper, 1960). This notation proposal was accompanied by a three-page paper requesting critical reactions to the proposal. See Philip Thiel, "Architectural and Urban Space: Notes on a Program for Research and Education" (working paper, 1960). Thiel notes in his "Interim Report" of November 1960 that he had, by this time, completed "the formulation and distribution of the proposal for a space sequence-experience notation." Philip Thiel, "Interim Report: November, 1960," 2, private collection of Philip Thiel. Also see the letters of correspondence between Thiel and his professional contacts Jim Ackerman, Don Shiveley, and Sami Hassid, dated from 1960-1962, located in Box C, Folder "Historical Precedents [correspondence, notes, and notations]," Thiel MSS.

empirical and arbitrary assumptions about space-experience," which he hoped to clarify through distribution to others.[309] This paper was published in almost identical form less than six months later in the April 1961 issue of *Town Planning Review*, in an article titled "A Sequence-Experience Notation for Architectural and Urban Spaces." This article laid out the framework for a new tool that would allow the planner or architect to understand spatial form in the way it was typically experienced: by an individual in motion through the urban fabric. This tool would supplement the traditional tools of the profession – the perspective sketch, plan, section, elevation, and model – but would go one step further. The existing tools, according to Thiel, suffered from one of two flaws: they presented space from a static viewpoint, or one that was abstracted and removed from everyday experience. The sequence-experience notation, on the other hand, allowed spaces to be captured and recorded dynamically, from the viewpoint of the individual on the ground. Once the language had been learned and perfected, it could be used to not only capture and understand existing space, but moreover to design and test spatial form that had yet to be created.[310] As its publication represents the first of any architectural space time notations in print, it is worthy of some attention here, particularly because it functioned both as a starting point for his intensive work on notational form and as a culmination of a decade-long study of the sequential nature of spatial experience.[311]

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[309] Thiel, "Architectural and Urban Space: Notes on a Program," 1.

[310] Philip Thiel, "A Sequence-Experience Notation for Architectural and Urban Spaces," *Town Planning Review* 32 no. 1 (April 1961): 33-52.

[311] Although the *Town Planning Review* article was published six months after the unpublished proposal of November 1960, citations will be taken from the later article, as it appeared in an established journal (the published article is almost identical to the unpublished proposal).

In his text, Thiel asserted that only an observer in motion could completely understand the meaning and fully perceive the sequence of the urban landscape. He described sequential movement through space as the same thing as sequential movement in time: "The perception of our visual world is a dynamic process involving the consumption of time…. Each space exists in a sequence-context."[312] He related motion through the city to other fields, such as dance and music, asserting all three as varying models of movement in time. For Thiel, this idea of movement in time was particularly relevant for urban design in his day and age: "[Movement in time] is also beginning to preoccupy the architect, the urban designer, the city planner and the landscape architect as it never has before. The reasons for this are several. Today we are 'using' our natural and man-made landscape along new paths of movement, and at unprecedented rates of travel." This notion of observation in motion allowed Thiel to conceptualize the urban landscape as a series of sequential encounters or perspectives, forming the basis for his sequence-experience notation. He noted that although the process of visual perception of the environment was a sequence of separate images, the final visual experience was continuous.[313]

Thiel asserted that a system of graphic notation needed to be invented to capture "the continuous representation of architectural and urban space-sequence experiences."[314] He emphasized the correspondence between architecture, dance and music: "The musician has a score, the dancer has Labanotation and the film editor has a 'storyboard'.

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[312] Thiel, "Sequence-Experience Notation," 33.

[313] Thiel, "Sequence-Experience Notation," 34.

[314] Thiel, "Sequence-Experience Notation," 34.

The architect and designer for their part have either only a series of perspective sketches, or orthographic projections: neither of which are adequate for the job."[315] Thiel's reference to dance notation is particularly telling, as it was a key precedent not only for Thiel, but also for Halprin. The earliest known dance notation emerged in the fifteenth century as a way of recording the sequences of five basic step patterns in relation to musical accompaniment. This early notation consisted of a musical staff and a corresponding letter system to describe the dance step to be performed in concert with the music.[316] In another staff-based system called Orchesographie, published by Thoinot Arbeau in sixteenth century, the name of the dance step was written out in full next to the corresponding note on the musical staff and was read from the top of the page downward.[317] (fig. 3.1) Over the course of the following centuries, many other systems were developed, some based on the musical staff and others separated from yet keyed to it, such as the Feuillet System.[318] By the nineteenth century, dance notation had evolved

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[315] Thiel, "Sequence Experience Notation," 34.

[316] The first published example appears in late fifteenth century Italy, in a book titled *L'Art et Instruction de Bien Dancer*. The notation that appears in this book, written by an unknown author, consisted of a musical staff and a corresponding letter system to describe the dance. Below each note or group of notes on the musical staff was written the first letter of the corresponding dance step or step pattern that was to be performed. A slightly earlier, but unpublished, example appears in a mid-fifteenth century Catalan manuscript. In this notation, letters are replaced by abstract symbols that indicate the number and types of steps. This notation, named Cervera for the municipal archives in which the manuscripts were first found, is the first known example in which abstract symbols were used to represent sequences of dance movement. Ann Hutchinson Guest, *Dance Notation: The process of recording movement on paper* (New York: Dance Horizons, 1984) 42-45 and Guest, "A Brief Survey of 53 Systems of Dance Notation," *Quarterly Journal of the National Centre for the Performing Arts* 14 no. 1 (March 1985): 1-2

[317] Arbeau's system was first published in 1588 (Guest, *Dance Notation,* 42-45 and Guest, "A Brief Survey," 1-2).

[318] The Feuillet system, separated the dance notation from the musical notation in an important way. The pattern traced by the two dancers across the floor formed the basic structure. Each dancer progressed along his or her own track, represented by a centerline that corresponded to the centerline of the dancer. A step by the right foot would, for example, be indicated on the right side of the centerline, with abstract symbols used to indicate the type of dance move or step. Interspersed along the centerline are bars that mark off

into a more graphic stick-figure system, such as in Arthur Saint-Léon's Sténochorégraphie.[319] (fig. 3.2) These stick figure notation systems, which continued to be published into the twentieth century by well-known dancers and choreographers such as Friedrich Albert Zorn, Vladimir Ivanovich Stepanov and Margaret Morris, directly conveyed the movements of the body through shorthand that consisted of representational bodily figures. However, the notation was still noted from the point of view of the audience. In order for the dancer to read the correct sequence of steps and movements from these scores, he or she had to take the mirror image of what was indicated in the notation.[320]

Labanotation, the dance notation referenced by Thiel, was created in 1926 by German choreographer and dancer Rudolph Laban[321] and was the first to describe the movements of the dance from the perspective of the dancer.[322] (fig. 3.3) Laban's system was based upon a multi-channel vertical track, aligned symmetrically down the middle with the centerline of the dancer's body. Each track represented a different part of the body: the closest track to either side was the support, followed by leg gestures, body, and arm. The movements of the head were indicated in a channel to the extreme right. A bar

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measures that correspond to the measures being played by the musical accompaniment (which is, itself, written across the top of the page). See Guest, *Dance Notation*, 45-47, 62-67 and Guest, "A Brief Survey," 2.

[319] Sténochorégraphie was the first notation to use modified stick figures to indicate the corresponding dance movement. Similar to some of the earliest dance notations, Sténochorégraphie embedded the figures once again inside the musical score itself as a method of conveying appropriate timing (Guest, *Dance Notation*, 45-47, 62-67 and Guest, "A Brief Survey," 2).

[320] Guest, *Dance Notation*, 71-76 (Zorn and Stepanov), 79-81 (Morris)

[321] The most well known codification of Labanotation appeared in Ann Hutchinson's *Labanotation* (New York: James Laughlin, 1954).

[322] This is apparent in Laban's floor plans and patterns as well as his actual dance notations (Guest, *Dance Notation*, 54).

in the appropriate channel would indicate when the given body part was to be used, with the length of the bar conveying the duration of the movement. The shape of the bar indicated the direction of the action (forward, backward, angled to the upper right, etc.) while its shading conveyed the height the action was to be performed on the vertical plane (high, middle, or low). The score was to be read from the bottom of the page upward, with the score extending in a continuous manner and thus allowing the continuity of time and motion to be easily conveyed. It has been noted that this singular arrangement parallels the dancer's vertical self-image just as it symmetricality parallels that of the dancer's body. Compared to many other systems of dance notation, Labanotation can be easily read (rather than painstakingly translated) because of the way its structure visually aligns with the individual's self-image and its perspective conforms to the dancer's viewpoint.[323] Although it did not attempt to record the actual environment for movement, its approach and intent were important precedents for Thiel and, later, Halprin.

For Thiel, none of the tools at the disposal of the architect and planner allowed for design that was temporally or sequentially motivated. Axonometric drawings and overhead plans were divorced from the everyday visual experience of design, as they were either fragmented or presented abstractly from above. Although perspective sketches successfully presented the viewpoint of the individual on the ground plane, they failed to capture the dynamic qualities of perception. Even the creation of multiple perspective sketches in a row, a process that was time- and labor-intensive, would leave some level of experiential discontinuity. The camera, though expensive, could work as a

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[323] Guest, *Dance Notation*, 81-88.

device to record pre-existing space but not as a tool to conceptualize un-designed space.[324]

Thiel's notation was grounded in his concept of an "anatomy of space," first developed in 1959, in which visual spatial experience was broken down into the relationships between three basic entities: surfaces, screens, and objects. (fig. 3.4) Surfaces were two dimensional planar forms that delineated boundaries; objects were three dimensional convex forms; and screens existed on the spectrum between surface and object, consisting of perforated surfaces or closely-spaced objects. The position established by each element in its surrounding space was described simply as over, side, or under. When taken together, the elements created one of three basic spatial types: vague (ill-defined); volume (well-defined); or space (on the spectrum between vague and volume).[325] (fig. 3.5) The anatomy of volumes and spaces was further classified by direction, type, and connection. If any one of the three dimensions of a space were two or more times greater than any of its other dimensions, it was called a run; if its dimensions had more parity, it was called an area. These spaces were also characterized according to their "form quality": if a space or volume was complete, symmetrical and balanced in form, it was O-type; if it tended toward expansion, mobility, and change, it was X-type.[326] (see fig. 5.11) The vocabulary of spatial experience was further defined by the way in which two spaces or volumes connected. The lack of a clearly defined transition was described as a merge, while a constriction such as a tunnel or narrow

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[324] Thiel, "Sequence-Experience Notation," 34.

[325] Thiel, "Sequence-Experience Notation," 35-6.

[326] Thiel, "Sequence-Experience Notation," 39-41. This symbolism later appeared in the notation of *The View from the Road* (see Chapter 4)

alleyway was called a port and a space that was neither a merge nor a port was called an end.[327]

The central element of the sequence-experience notation was a movement line, similar to the musical staff, which was read from the bottom of the page upward. (fig. 3.6) The movement line was broken into constant time intervals and read against distance intervals to indicate acceleration and deceleration of the moving body as well as temporal sequence.[328] Immediately adjacent to the movement line were ten columns, each of which represented a different space zone. In order to more easily identify the differences between these two spaces, Thiel created a system of 10 zones, each of which was defined by its size and determined using a logarithmic scale.[329] (fig. 3.7) Each spatial portion of the journey occurred in at least one of these ten zones and was indicated by a solid black line – the duration line – whose length was determined by the time it took the observer to physically traverse the space. Occasionally, two spaces of different types existed simultaneously; this was noted by the existence of two duration lines existing within the same time interval. Whenever the boundaries of the space increased or decreased to the point that the observer moved into a different space zone, the duration line correspondingly shifted to another column.[330]

A shift between space zones was also accompanied by a port/merge/end designation that indicated how the two spaces connected to one other. A port was

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[327] Thiel, "Sequence-Experience Notation," 44-45.

[328] Thiel, "Sequence-Experience Notation," 52.

[329] Thiel, "Sequence-Experience Notation," 43-44. Thiel borrows this idea from Gibson, who divided the range of space experience into aerial space and local space in his 1950 book, *Perception of the Visual World*. See later in this chapter for more information on the connection to Gibson.

[330] Thiel, "Sequence-Experience Notation," 50-51.

represented by a small circle on the time-line while a merge was indicated through the use of parentheses. If the connection was of an “end,” then the only indication given was the shift of the duration line.[331] The experience of entering another space zone was marked not only by a shift of the duration line to another column, but also by a space-form notation, which indicated the degree of enclosure being experienced by the observer in relation to enclosing walls or screens at given points along the journey.[332] (fig. 3.8) This notation was a more elaborate form of the symbology he had developed in his Berkeley working paper of 1959, “A Proposed Space-Notation.” Like this earlier paper, enclosing surfaces were represented by smooth planes while enclosing screens were symbolized through multiple dashed lines.[333] However, the height of the space was now also shown by a number written just above the notation. In addition, the relative position of the observer within the space was marked by two numbers below the notation, each of which denoted the fraction of the total space that existed to the left and right of the observer, respectively.

Not only was Thiel’s first published notation difficult to read and complicated to decode, but the two notation examples that appeared in the *Town Planning Review* article were moreover hypothetical only and did not clearly convey how the notation could be practically used. Over the course of the following year, Thiel published three more articles that further explained the notation and offered examples of its potential for use.[334]

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[331] Thiel, “Sequence-Experience Notation,” 51-52.

[332] Thiel, “Sequence-Experience Notation,” 50-52.

[333] Thiel, “Sequence-Experience Notation,” 38.

[334] Philip Thiel, “To the Kamakura Station,” *Landscape* 11 no. 1 (Autumn 1961): 6-10; Philip Thiel, “An Experiment in Space Notation,” *Architectural Review* 131 (May 1962): 326-29; Philip Thiel, “An Old Garden, A New Tool, and Our Future Cities,” *Landscape Architecture* 52 (July 1962): 226-32.

After the preparation of his draft proposal in November of 1960, Thiel dedicated substantial time to visiting multiple gardens and shrines in Japan, analyzing their approaches and spatial sequences, field-testing his notation on site, and developing several concrete notational scores. Among the gardens he visited was the Jiko-in, a house and garden in Japan.[335] He published his spatial analysis and notation for the property in an article titled "An Experiment in Space Notation" in the May 1962 issue of *Architectural Review*. In the article, Thiel described the approach to the Jiko-en as "an excellent small-scale example of the quiet orchestration of spatial sequences."[336] According to Thiel, the visitor was subtly manipulated during the gentle ascent from the plain to the building atop the low hill. The path was scripted to follow several turns and a series of gates, each of which brought the visitor that much closer to the final goal. He again allied the arts of architecture and urban design with those of music and the dance: "The choreographer may try out a few steps; the musician can play a few bars; but the designer must make some marks on paper; he thinks with his pencil." He continued: "What is needed is a simple hierarchical system that will permit the designer to quickly explore, via scribbles on paper, a variety of ideas dealing first with the major attributes of spatial experience: of the dynamics of movement, and of the… character and relationships of the spaces of a proposed sequence."[337]

The notation he published in this article was vastly simplified when compared with his initial proposal and his *Town Planning Review* article. (fig. 3.9) Thiel dispensed

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[335] Philip Thiel, "Final Report: October 1961," 1, private collection of Philip Thiel.

[336] Thiel, "Experiment in Space Notation," 327.

[337] Thiel, "Experiment in Space Notation," 327.

with the multi-channel space-zone framework and replaced it with a dual-channel framework of a movement line and a space-duration line. The movement line on the left was broken into increments of time and distance, which could be used to calculate rate of locomotion. Turns in the path were indicated by rectangles that protruded to either side, accompanied by a number signaling the degree of the turn. Ascent and descent were represented by solid triangles supplemented with a number that measured the distance (in feet) of rise or fall. Along the space duration line, the space-form notation that appeared in the *Town Planning Review* article reappeared, but with a new name, "space-establishing element position indicators" and augmented with additional information. In addition to giving the position of the observer and the height of the space, the position indicators also gave the space's length and width (the numbers, clockwise from top, represent the height, length and width of the space and the position of observer). As before, the position of surfaces, screens, and objects was marked by solid and dashed lines that indicated the nature of the enclosure. Accompanying the space notation was a scaled plan of the approach as well as a series of sequential photographs taken at moments along the journey. (figs. 3.10, 3.11) All three pieces – the notation, the plan, and the photographs – were read from the bottom of the page upward. They were keyed to one another to allow the reader to follow along the approach and compare the notational markings with the visual aspects in the photographs and the path traced through the plan. The photographs were further annotated with textual descriptions of the approach that conveyed a narrative aspect to the sequence through the landscape.[338]

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[338] Philip Thiel, "An Experiment in Space Notation," *Architectural Review* 131 (May 1962): 326-29.

Another significant trip for Thiel during his last few months in Japan was his visit to the Koishikawa Koraku-en garden, one of Japan's large "tour" or "stroll" gardens.[339] This type of garden was intended to be experienced by the active observer in motion, as distinguished from the class of Japanese gardens meant to be contemplated by a stationary observer. The garden, which was created in 1629, stretched over 17 acres and consisted of 15 areas of distinct character and quality, woven together with a network of paths to create an intricate experience for the visitor on foot. As with the Jiko-in, Thiel prepared a notational sequence for a path through the garden, which he published in *Landscape Architecture* in July of 1962, in an article titled "An Old Garden, A New Tool, and Our Future Cities." (fig. 3.12) This notation presented a much more elaborate sequence of spaces than the one found in the Jiko-en. It was keyed to a plan showing the visual structure of the distinct areas of the entire garden, labeled with descriptors such as open lawn and lake-side to winding woody paths, steep wooded hills, and labyrinths. (fig. 3.13) Also included was a more detailed plan of the portion of the path notated by Thiel, (fig. 3.14) keyed as before to the space notation itself as well as a series of snapshots taken along the way. Due to the increased complexity of the path and spaces, some points were annotated with multiple space-establishing element position indicators (or SEEPIs), meant to represent the occupation of multiple nested spaces at once.[340]

Thiel used the dynamic experience of Koishikawa Koraku-en as a teaching point for Western urban planning:[341]

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[339] Thiel, "Final Report," 1.

[340] Thiel, "Old Garden, New Tool," 226-32.

[341] Over the course of his career, Thiel took multiple research trips to Japan and continued to be inspired by the subtlety and variation of spatial sequence evident in the country's landscapes, gardens, and shrines.

> As an example of a grouping of diversified areas designed to be experienced by an observer in motion, [Koishikawa Koraku-en] is of special significance to us today in our effort to understand and our need to control the form of our manmade environment. This is because the urban experience is a sequence of vistas, not a static view; we *move through* the city on our daily round…. In this flux of experience there is an opportunity for great poetry if we can gain the facility of manipulating the urban form elements which, when seen in sequence, communicate meanings to us. The Koishikawa Koraku-en can thus be appreciated as an existing example of ordered sequence-relationships, on which we can test and perfect new tools for this new job of both sequence-form analysis and sequence-form conceptualization. The use of such tools for analysis will develop awareness and sensitivity; their use for conceptualization will facilitate the flow of creative imagination.[342]

Lawrence Halprin: Design for Movement and Early Research in Notation

Until January of 1960, when Lawrence Halprin incorporated his firm into Lawrence Halprin & Associates, Inc., both Halprin's publications and his landscape architectural production dealt mainly with relatively modestly-sized projects such as residential gardens and small shopping malls. For the first eleven years of his private practice, Halprin was commissioned to design an average of over 30 private gardens per

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In 1964, for example, after he had returned to America and joined the faculty of the College of Architecture and Urban Planning at the University of Washington in Seattle, he began to develop an "illustrated glossary of terms concerned with Japanese environmental design" to allow discussions in English of Japanese techniques. Philip Thiel, A memorandum on a proposed illustrated glossary of terms concerned with Japanese environmental design, 24 January 1964, Box A, Folder "[Glossary of Japanese Environmental Design Terms]," Thiel MSS. That same year, Thiel became interested in using the Japanese Garden at the University of Washington Arboretum as a case study for a class on Sequence-Experience Design. He proposed to teach students his notation as a design tool and then use it to record the garden path network. Philip Thiel, Memo on a Plan for a Ten-Week Problem in Sequential-Experience Design, 4 February 1964, Box C, Folder "[Japanese Stroll Gardens]," Thiel MSS. See also Philip Thiel, "A Note on Japanese Gardens, with a special reference to the garden at the University of Washington Arboretum," Box C, Folder "[Japanese Stroll Garden in Seattle]," Thiel MSS. Although the class never progressed beyond the proposal stage, Thiel continued his research on Japanese gardens and environmental design, writing and publishing several papers on the topic over the course of his career. According to Thiel, this class never came to fruition, although he did pursue several research leads on the topic over the years. Philip Thiel in phone conversation with the author, September 2009. See, for example, Philip Thiel, "Notes on the Contemporary Urban Paradigm in the Feudal Japanese Garden" (selected Paper in Asian Studies, Western Conference of the Association for Asian Studies, Boulder, CO, October 10-11, 1975; published in 1976).

[342] Thiel, "An Old Garden," 227.

year; between 1950 and 1955, the average was closer to 40.[343] During this time, however, he also began to expand his oeuvre. He received his first commission for a public garden at Marin General Hospital in Novato, CA in 1950, designing pathways, gardens, public art, and recreation areas for ambulatory patients.[344] Institutional projects from the 1950s included landscape master planning for the University of California at Davis (1952) and Berkeley (1953-60, respectively) and the Givat Ram Campus of Hebrew University in Jerusalem (1957-60).[345] He also worked on larger shared or public garden commissions such as Greenwood Common in Berkeley (1953-58), the Golden Gate Baptist Theological Seminary Garden in Mill Valley, CA (1955-58), and Washington Square Park in San Francisco (1956). Housing projects from this time included Easter Hill Village low-income housing in Richmond, CA (1953-55) and Married Student Housing at the University of California in San Francisco (1957-61). Halprin's projects for corporate clients included the Stanford Medical Plaza in Palo Alto (1957-58) and the Washington Water Power Corporate Headquarters in Spokane, WA (1955-59).[346]

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[343] William Whitaker, "Appendix: list of Halprin's private garden commissions," *Studies in the History of Gardens & Designed Landscapes* 27 no. 4 (October-December 2007): 356-361. According to Whitaker, the number of private garden commissions per year in the 1950s and 60s were as follows: 1950: 43; 1951: 43; 1952: 52; 1953: 29; 1954: 33; 1955: 28; 1956: 30; 1957: 16; 1958: 22; 1959: 24; 1960: 10; 1961: 6; 1962 through 1967: 2/yr; 1968: 1; 1969: 2.

[344] "The Chronology," 117.

[345] Halprin was engaged in his Jewish heritage from an early age; his mother was the national president of a woman's Zionist organization and he spent several summers working on a kibbutz near Haifa, Palestine during his childhood. "Chronology," 114.

[346] "The Chronology," 117-122. He also received his commission for Capitol Towers Housing in Sacramento (1958-65) at this time, although the project was not completed until 1965. "The Chronology," 122.

In 1960, when Halprin incorporated his office into Lawrence Halprin & Associates, Inc., his emphasis shifted to the larger public environment. Indeed, Halprin received some of his most famous and renowned large-scale public and urban commissions in the 1960s: Ghirardelli Square in San Francisco (1962-68), Embarcadero Plaza and Fountain in San Francisco (1962-72), Nicollet Avenue Transit Mall in Minneapolis (1962-67), and Seattle Center (1962-64).[347] In all of these projects, developed at a time when his practice incorporated and expanded in scale, Halprin applied his earlier interest in design for movement to the larger scale of the public environment.

Hirsch has noted that California was experiencing a population explosion during the time Halprin expanded his practice to the larger public environment. Between 1960 and 1965, the state underwent a doubling of its populace and experienced a corresponding need for new communities, buildings, and support services such as schools and businesses.[348] The incorporation of his office in 1960 allowed Halprin to expand and take on larger and more ambitious projects made possible by rapid population increases and influx of money in connection with renewal and redevelopment.[349]

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[347] "The Chronology," 126-131. In 1976, Halprin received one of his most famous commissions: The Franklin Delano Roosevelt Memorial in Washington, D.C. "The Chronology," 141-142.

[348] Hirsch, "Choreography," 269. Hirsch also notes that Halprin was most involved in the private domestic realm during the first eleven years of his practice.

[349] Unsurprisingly, the year Halprin incorporated his office, his garden commissions dropped to 10, followed by 6 in 1961, and then no more than two per year over the remainder of the 1960s. Whitaker, "Appendix," 356-361.

Fountain Notation: 1960-62

In the early 1960s, while Philip Thiel was testing his notation by walking through Japanese gardens and shrines, Lawrence Halprin began to experiment with abstract graphic language as a tool to program water and lighting effects for fountains. Although Halprin had used water as a device in many of his smaller private gardens, several commissions he received for large public fountains allowed him to focus on the possibilities of scripting water effects on a grander scale.[350] Between 1960 and 1962, Halprin began to develop a shorthand notation for the synchronization of advanced water effects in various fountains. Designed as part of a larger landscaping plan, these fountains represented Halprin's earliest ideas on the potential of moving water to mold a viewer's experience through vision, and sound. Halprin later wrote: "Qualities of mobility… are difficult to conceptualize or control without scores. For that reason scoring is invaluable in designing, for instance in fountains and water effects, where water, the shapes of water, and their changing characteristics are essential to the design process."[351] The fountain scores could, in Halprin's own words, "predetermine and control intricacies of height, jet size, sequence in time, noise (or sound) volumes, and lengths of time and these can be plotted against each other."[352]

The experimentation ground for Halprin's first forays into fountain scoring lay in

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[350] Experimentation with effects of sequencing outdoor lighting for fountains has a long tradition, as evidenced by the Paris World's Fair of 1889. See Annegret Fauser, *Musical Encounters at the 1889 Paris World's Fair* (Rochester: University of Rochester Press, 2005), 279.

[351] Lawrence Halprin, *RSVP Cycles: Creative Processes in the Human Environment* (New York: George Braziller, Inc.: 1969): 54. Although Halprin first published his earliest fountain scores in his book *Cities* of 1963, his most revealing text on the process of scoring for water effects appeared in his *RSVP Cycles* in 1969.

[352] Halprin, *RSVP Cycles*, 54.

the realm of commercial architecture, namely, the outdoor shopping center. In 1962, two outdoor shopping malls opened at opposite poles of the country: Seminary South Shopping Center in Fort Worth, Texas and Oakbrook Terrace Shopping Center in Oakbrook, Illinois.[353] Both were designed by Architects Loebl, Schlossman & Bennett of Chicago, with Halprin as consulting landscape architect. The outdoor, open-air program for the shopping centers allowed Halprin to include fountains in his landscaping while new advances in programmable effects gave him the opportunity to develop intricate patterns of water, light, and sound that changed over time. In both malls, there was one main fountain with a complex of water, light, and sound effects that Halprin designed to varying effect with the aid of his newly developed fountain notation.

At Seminary South,[354] the mall was laid out so that the stores all turned inward,

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[353] Halprin's first shopping mall commission was for Old Orchard Shopping Center in Skokie, Illinois, which was also a collaboration with lead architects Loebl, Schlossman & Bennett. Halprin received the commission in 1955 and the mall was completed in 1957 with favorable reviews [see "Garden Setting Lends Charm to Chicago's Newest Center," *Architectural Record* 122 no. 3 (September 1957): 220-227]. The mall contained at least one Halprin-designed fountain with underwater lights, although no indication exists that a fountain score was developed. The park-like setting, kinetic arrangement of pedestrian spaces, overhead canopies, and variation of textures and materials, particularly underfoot, added to an atmosphere that drew people to the mall even on Sundays when all the shops were closed. The main tenant was Marshall Field & Company, with a large centrally-located store flanked by specialty stores, a Fair Department Store, supermarket, variety store, drug store, and restaurants. In addition to "Garden Setting Lends Charm," cited above, see "The Chronology," 120 and "Shopping Can Be A Pleasure," *Architectural Record* 122 no. 3 (September 1957): 205.

[354] In addition to Loebl, Schlossman & Bennett, Halprin also collaborated with George L. Dahl of Dallas and Preston M. Geren of Fort Worth as local architects. The shopping center was sited on Katy Lake, which had been dammed in 1908 by the Katy Railroad to create a water supply for its locomotives. In 1959, 50 million gallons of water were drained from the lake and over 11 million cubic feet of dirt was removed to enable construction on the site. "Engineering Magic: From Lake to Shopping Center," *Seminary South: The Forward Look in Smart Shopping: Southwest's Greatest Shopping Center Opens March 14th* c. March 1962, p. 2. Folder "Seminary South Shopping Center; project files, 1960-1962," call no. 014.I.A.2444, Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania, Philadelphia (hereafter Halprin Collection). The project was developed by Homart Development Co., an entirely owned subsidiary of Sears Roebuck & Co., which had been created in January of 1961 to "develop, own and operate shopping centers in areas where a major Sears facility was needed in conjunction with the need of a complete shopping center." "New Shopping Center, With 70 Outlets, Largest in Texas," *Seminary South: The Forward Look in Smart Shopping: Southwest's Greatest Shopping Center Opens March 14th* c. March 1962, p. 2. Folder "Seminary South Shopping Center; project files, 1960-1962," call

away from the parking lot, on to a wide central pedestrian corridor. Halprin's landscaping, which was laid out all along the pedestrian corridor, was a focal point, and his fountains were primary and essential anchors in his overall design. In all, there were four water features spread throughout the mall plan: Pool and Water Cascade in the North Mall, Pool in the West Mall, and the Main Pool Complex at Sears Roebuck.[355] Of the four water features, only the Main Pool Complex was scored for changing water effects.[356] This complex, the most elaborate, was appropriately set in the plaza in front of the flagship Sears & Roebuck store. (fig. 3.15) The fountain was arranged in three concentric rings, each ring containing a group of jets of a specific type and height and

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no. 014.I.A.2444, Halprin Collection. Seminary South, the first project completed by Homart, not only contained the largest Sears Roebuck store in Texas, but it also represented the largest single retail construction investment ever made by Sears until that point. In fact, the center was the first shopping center to be entirely developed, owned and operated by Sears. At the time of its completion, Seminary South was the largest shopping center not only in Texas but also in the whole Southwest with 85 acres, 900,000 square feet of rentable space, and a $9 million price tag. "Shopping Center," *Architectural Forum* (July 1962): 16. Moreover, the shopping center opened with almost 90% of its rentable space already leased. "New Shopping Center," *Seminary South: The Forward Look*, p. 2, Halprin Collection.

355 Sears was the largest tenant; its location, at the juncture of the two perpendicular arms of the mall, anchored the entire complex. See Letter, J. T. Pattenson to Sam Sirmen, 29 August 1961, and Revised Quotation P-1300-R-4, Kim Lighting and Manufacturing Co. to Traweek-Healy & Associates, 17 August 1961, Folder "Seminary South Shopping Center; project files, 1960-1962," call no. 014.I.A.2443, Halprin Collection. As noted in th letter from Pattenson to Sirmen, the former was the Vice President of Engineering at KIM Lighting & Manufacturing Company (the consultant who provided all the water and lighting fixtures on the project), and the latter represented the local architect George L. Dahl & Associates, of Dallas, Texas. The letter also notes discrepancies in the indicated fixtures in some of Dahl's drawings and is accompanied by a revised quotation that provides an updated accounting of final fixtures and specifications for all four water features in the project.

356 The Pool at the North Mall contained a relatively elaborate mixture of fixtures, including four mushroom jets, 20 precision jets, 31 aerating jets and a series of underwater fountain lights of varying wattages, but was not designed for programmable water effects. No "sequence programmer" is included in the specifications for this fountain. See Revised Quotation, Kim Lighting to Traweek-Healy, 17 August 1961, Halprin Collection. The Water Cascade at the North Mall was a relatively modest affair compared to the pool, with a single 2" bubbler jet and 40mm aerating jet, in addition to a similar mixture of underwater fountain lights. The Pool in the West Mall, meanwhile, was designed with a very different visual effect. Six aerating jets of varying heights were arranged in a cluster, each one set in a conical copper dish and raised upon a red brass pipe stem above more underwater fountain lights. See Revised Quotation, Kim Lighting to Traweek-Healy, 17 August 1961, Halprin Collection; and also Lawrence Halprin, *Cities* (New York: Reinhold Publishing Corporation, 1963): 155, 223, where this score was first published, in 1963.

connected to a sequence programmer that controlled all the water effects and their coordination with the underwater fountain lights. In the center was a specially fabricated cluster of jets arranged around a 4" ring that produced water amplitudes between 10 and 20 feet. The next circle of jets, set around a 12' diameter ring, were the "ring jets." 31 equally spaced aerating jets comprised this circle, which reached water amplitudes between 6 and 12 feet. The outermost circle of jets, the "rim boilers," was composed of 6 bubbler jets, equally spaced around the periphery of the fountain and intended to perform at amplitudes less than 5 feet. The main fountain was surrounded by a circle of paving, into which were set six smaller fountains on raised pedestals, each with its own aerating jet with spun copper architectural ornament shields.[357]

The first piece of Halprin's fountain notation existed in the form of a drawing dated May 10, 1962 and titled "Revised Sequence: Pool at Sears – Seminary South Shop. C." (fig. 3.16) This drawing provided an overall bar graph indicating the on and off states of each major fountain element, separated into rows and metered by time.[358] Down the left side of the graph, each row has its own title that corresponds to a specific

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[357] Revised Quotation, Kim Lighting to Traweek-Healy, 17 August 1961, Halprin Collection. Also see two original drawings in the Halprin collection: Lawrence Halprin, "Score for the Seminary South Fountain," 1961-62, Large drawings file "Seminary South Shopping Center," call no. 014.II.A.178, Halprin Collection (original score signed "Lawrence Halprin," top right); and Richard Vignolo, "Seminary South S.C. Fort Worth," Large drawings file "Seminary South Shopping Center," call no. 014.II.A.177, Halprin Collection (signed "R. Vignolo," bottom right).

[358] Although the mall opened in March of 1962, it does not appear that the final sequence for the water effects at the Main Pool Complex was finalized until at least May of that year. The Revised Summary is dated May 10, 1962, but it is clear from archived correspondence between Halprin, the main architects, and the lighting and water fixture consultants that final details for the fountain were largely finalized during1961. A letter between consultants from Humber & Co and Kim Lighting & Manufacturing Co. dated January 1961 indicate that final details on the fountains had not yet been confirmed and that a sequencing diagram for the central effect of the Main Complex at Sears was still needed (Letter, Merrill R. Humber to Rich Cram, 17 January 1961, Folder "Seminary South Shopping Center; project files, 1960-1962," call no. 014.I.A.2445, Halprin Collection.) The Revised Quotation from August 17, 1961, however, shows that many of the fountain specs had since been finalized. Revised Quotation, Kim Lighting to Traweek-Healy, 17 August 1961, Halprin Collection.

water element – center jet, ring, bubblers, jets – or lighting element, described by its wattage and color: 500 clear, 500 blue, 300 red, 300 green, 300 clear. Across the top of the graph, a timeline of seconds is given in 30-second increments, stretching from left to right from 0 to 900, indicating that the entire circuit for the fountain's changing effects was intended to be 15 minutes. The body of the graph uses a simple solid bar in each row to indicate when each element was to activate, turn off, and restart. The three main jets comprising the fountain – the center, ring, and bubblers – turned on and off 4 or 5 times each, at different times and for varying durations. The six outer jets (labeled simply "jets" in the drawing") were intended to run continuously and were thus represented by a solid bar stretching from one end of the graph to the other. Similarly, the five different underwater fountain lights turned on and off between 5 and 7 times at different moments, in synchrony with the start or end of one of the water or lighting effects. At the end of the graph, between seconds 840 and 900, a note indicates, "quiet for 60 seconds." In other words, 14 minutes of varying water and lighting effects were followed by a full minute of calm, punctuated only by the continually running six smaller fountains that circled the main fountain.[359] Although this drawing provided information on the overall coordination of when each effect would be active, it gave no essential details as to the visual effects of the fountain.

These effects, from water height and character to audio effects, was captured on

[359] Lawrence Halprin & Associates, "Revised Sequence 5/10/62: Pool at Sears - Seminary South Shop. C.," Large drawings file "Seminary South Shopping Center," call no. 014.II.A.178, Halprin Collection. This drawing is not personally signed by Halprin but the title block reads "Lawrence Halprin & Associates, Landscape Architects."

the "Score for the Seminary South Fountain."[360] (fig. 3.17) This score combined the water effects for the three sets of jets comprising the main fountain – the center jet cluster, ring jets, and rim boilers – into an orchestral whole using Halprin's newly-created system of fountain notation (the six smaller fountains remained on continually). Four graphs are shown, each of which plotted changing water effects over time. Read from left to right, the graphs present time progression on the X axis and water height on the Y axis. Of the four depicted graphs, three show the individual water effects of the component jets. Each graph is keyed to its respective jet (central cluster, ring, or boiler) by means of a small plan diagram. The fourth graph, shown at the top of the drawing, is an aggregate that combines and superimposes the water effects of all three jets. As the graphs progress from left to right, the water heights change over time, shown by variation in the two axes.[361]

The score also provided descriptions of water character, water action, and pool surface, given by symbols in a legend to the left of the drawing and interspersed within the score. The symbols were given in one of two additional rows: "visual," which ran

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[360] Although the drawing is undated, it is likely that it was completed between May 1962 and November 1963. It is clear that the score was completed before November 1963, as it was published that month in *Cities*, but the start date is a little less certain. It is likely that it was completed after May 1962, as a notebook entry from that date shows Halprin just beginning to work out details for a fountain scoring system for Oakbrook (see Oakbrook description below). The Oakbrook notebooks entry, dated May 12, 1962, shows a system that is still nascent and in the process of being perfected. By contrast, the "Score for the Seminary South Fountain," is highly developed and formalized and betrays a proficiency and ease of working with fountain scoring concepts. Thus, the "Score for the Seminary South Fountain" was most likely completed some time between the Oakbrook notebook entry and the publication of *Cities*, either as a design tool or quite possibly after the fact. This places the "Revised Sequence" as the first chronologically among the three. However, the sequence shown in "Revised Sequence" and "Score for the Seminary South Fountain" are almost identical, suggesting either that "Revised Sequence" was the final sequence used in the fountain or that "Score for the Seminary South Fountain" was completed soon after "Revised Sequence."

[361] Halprin, "Score for the Seminary South Fountain," 1961-62, Halprin Collection. See also Halprin, *Cities*, 160-1.

above the main water height row, and "audio," which ran below. Water character could be, for example, exuberant, slow, or pulsating, while water action could be defined as a broken edge, sheet flow, or droplets. The symbols under "pool surface," for example, indicated which portions of the pool were active versus quiet. Finally, a third row at the bottom of each graph, titled "lights," was broken into color divisions of yellow, blue, red, or green, and was meant to indicate the timing for the fountain's underwater lights, which turned on and off in synchrony with various water effects.[362]

At Oakbrook Center, completed the same year as Seminary South, Halprin designed seven distinct water features as part of his larger landscaping plan in collaboration with Loebl, Schlossman & Bennett. The mall was co-owned by Marshall Field & Company and Sears Roebuck & Company, each of which had a principal anchor store on the mall: Marshall Field at the southwest corner and Sears at the northernmost end.[363] Here again, Halprin turned the stores inward on a central pedestrian corridor, which zigged and zagged to create multiple corners and spaces of compression and release.[364] (fig. 3.18) In developing the landscape plan, Halprin again paid particular attention to the sequence of spaces and choreography through pools, planting, graphics, and paving in order to create "gardens for shopping." He also modified the landscaping for the colder, windier climate, providing shelter from gusts and maximizing warmth

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[362] Halprin, "Score for the Seminary South Fountain," 1961-62, Halprin Collection. See also Halprin, *Cities*, 160-1.

[363] "Unified Variety on a Fountained Mall," Architectural Record 135 no. 7 (June 1964): 166-169.

[364] Lawrence Halprin, "Oakbrook Terrace, First Pass - Mall Landscape Plan," 19 June 1959, Large Drawings File "Oakbrook Terrace Shopping Center," call no. 014.II.A.128, Halprin Collection. Although this drawing lists the plan as a first pass, in building layout it is almost identical to the final version, published in 1964. The drawing is unsigned but the title block reads "Lawrence Halprin, Landscape Architect," as his office was not yet incorporated in 1959.

generated by sunlight.[365] The seven water features were spread out through the highly kinetic series of spaces, each one pulling the visitor around the corner to the next feature. The seven water features included two fountains on raised platforms, two sunken pool areas, a cascade, and two long rectangular pools, one with jets. Interspersed among the water features were sunken sitting areas, bridges, stairs, flower parterres, raised platforms with trees, and shifts in the color and texture of paving and floorscape. The two largest fountains, both on raised platforms, were located at opposite ends of the interior pedestrian corridor in plazas and placed in front of the Marshall Field and Sears Roebuck stores.[366]

At least one of these two fountains was most likely programmed with sequenced water effects. In a notebook entry[367] dated May 12, 1962 and titled "Score Systems for Fountain Notations," Halprin detailed a partial test score for "Oakbrook fountain #4."[368] (fig. 3.19) In this score, three graphs stretch across the page: one for the four middle jets, another for the five outside jets, and a combined score at the top with a color bar to indicate the lighting element. Water height between 0 and 20 feet is given on the left and time progression is represented on the horizontal axis. Although its framework is quite similar in visual form to the more formalized Seminary South Score, it is clearly at an earlier stage of development. Halprin seems to be working through the framework, noting, "horizontal equals time – vertical equals height, for example pool #4 at

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[365] "The Chronology," 123.

[366] Halprin, "Oakbrook Terrace, First Pass - Mall Landscape Plan," Halprin Collection.

[367] Selections from Halprin's private notebooks were published in 1972 as: Lawrence Halprin, *The Notebooks of Lawrence Halprin, 1959-1971* (Cambridge, MA: MIT Press, 1972).

[368] Lawrence Halprin, "Score Systems for Fountain Notations," in Halprin, *Notebooks*, 71-72.

Oakbrook," and then a few lines lower, "above done all as direct elevations. Verticals are heights. Horiz. are time indic. in brackets above scale." In this entry, Halprin attempted to represent time progression in two ways: through a time scale stretching along the bottom (as in the later Seminary South Score) or through brackets above the water effects with numbers indicating total duration for that portion of the score. In addition, there are far fewer symbols for additional water effects shown in the entry and those that are shown seem to be experimental. Several of these, such as "~~sheet~~ fall broken by edge serrations" and "sheet fall," are scratched out and drawn over as if Halprin was testing out what might work best in a given scenario. Halprin also compared these metered scores against non-sequenced fountains, noting, "for fixed fountains, use simple elevations," in which the fountain elevation is modified with symbols indicating which portion of the fountain should gurgle, gush, or glissand.[369] Although Halprin designed a

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[369] Halprin, "Score Systems for Fountain Notations," 71-72. The Oakbrook fountain score was most likely either an early attempt or a work in progress, as it was labeled "partial test score" in the entry. In fact, a short note is required here on the sequence of scoring events between Seminary South and Oakbrook, as they provide essential clues to understanding where and when Halprin began to develop his fountain scores. He received the commission for Oakbrook at roughly the same time as Seminary South, between 1959 and 1960. In both cases, he developed fountain sequencing drawings in May of 1962: the Seminary South "Revised Sequence" is dated May 10, 1962 while the Oakbrook notebook entry is dated May 12, 1962. Despite this congruence, unavoidable discrepancies between the two projects exist. The score for Seminary South was developed, finalized, and almost definitely implemented, as described above. In addition, the score itself remains in good condition, housed in the Halprin Collection of the Architectural Archives of the University of Pennsylvania, and was, moreover, published in *Cities* in 1963. By contrast, any such final score for Oakbrook is all but nonexistent in his archival files. In fact, the only clue to the fountain score developed for Oakbrook exists the two-page notebook entry described above, in which the fountain is labeled #4. Comparison with corresponding sketches in Halprin's archival files for fountain #4 only yield further confusion, as the sketches do not visually match any of the fountains in the overall Oakbrook Center plan or the fountain sketches included in the notebook entry. (Refer specifically to the following drawings: Lawrence Halprin, "Pool 4 Oakbrook: Pylons Spouting Water," and "Oakbrook Pool 4: 6 Units," both undated and located in Large Drawings File "Oakbrook Terrace Shopping Center," call no. 014.II.A.128, Halprin Collection) This makes it difficult to accurately identify which fountain (if any) in Oakbrook was definitively sequenced. However, given that Halprin was actively engaged in experimenting with and developing a notation for coordinated and sequenced water and light effects at this time, and given the scoring system sketches for Oakbrook in Halprin's notebook, it is very possible that one of the Oakbrook fountains was indeed scored for sequential effects, and that the score has since been simply misplaced or destroyed.

number of fountains during the early 1960s, it is not clear how many more, if any, were designed for programmable water and light effects.[370]

Halprin and the Score for *Five-Legged Stool*

At the same time that Halprin was developing scores to choreograph the water effects of fountains, he was also experimenting with the possibilities of applying a similar scoring framework to record the avant-garde dance choreographies of his wife, Ann. After the Halprins moved to San Francisco, Ann continued her correspondence with John Cage; over the following years, the Halprins developed an enduring friendship with both Cage and Cunningham, hosting them during their visits to San Francisco and presenting their works in the outdoor studio behind their house.[371] It was through Cage that Ann was first introduced in 1960 to the avant-garde composer La Monte Young, who was studying music at the graduate program in Berkeley along with fellow musician Terry Riley. Ann began collaborating with Young and Riley, engaging in improvisation sessions that explored the boundaries of experimental music and dance, and soon asked

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[370] No scores other than the three discussed above were evident in a number of the large drawings project files for many of these projects at the Halprin Archive. Thus, it is difficult to determine the extent to which Halprin made any more detailed scores for fountain designs. The files examined include the following Large Drawings Folders at the Halprin Archive: 014.I.B.1726 Hatfield; 014.II.A.052 Foothill Square Shopping Center; 014.II.A.068 Hayward Fountain; 014.II.A.069 Herrick Iron Works; 014.II.A.105 and .106 Medical Plaza Inc.; 014.II.A.197 U.C. Berkeley- Sather Gate and Student Union/Cafeteria; 014.II.A.217 University of Washington- Frosh Pond/Drumheller Fountain; 014.II.A.226 and .227 Washington Water Power; 014.II.A.128, .129 and .130 Oakbrook Terrace Shopping Center; 014.II.A.139 Parke-Davis; 014.II.A.061 and .061a Ghirardelli Square; 014.II.A.021, .022 and .163 Capitol Towers; 014.II.A.144, .147, .149 and .150 Portland Parks and Malls Auditorium, Pettigrove Park, Auditorium Forecourt, and Lovejoy Plaza.

[371] Worth and Poynor, *Ann Halprin*, 8 and Janice Ross, *Ann Halprin: Experience as Dance* (Berkeley: University of California Press, 2007), 106-107.

them to become Musical Directors for her dance company,[372] the San Francisco Dancers' Workshop.[373] Although Young left the Bay Area in 1960 and Riley in 1962,[374] Ann quickly began collaborating with others in the experimental music circle.[375] In fact, dancers from her company often collaborated with avant-garde musicians Ramon Sender and Morton Subotnick in various performances, such as the SONICS series, between 1961-1962.[376]

In 1962, Ann developed the concept for a piece titled *Five-Legged Stool* that was conceived as a 90-minute piece comprising two acts.[377] There were four dancers in total: Ann and three of the central members of her San Francisco Dancers' Workshop.[378] Over the course of the evening, each dancer would carry out certain tasks in front of the audience, either in a solo performance or in partnership with the other dancers. These

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372 Ross, *Experience as Dance*, 141-146.

373 Ann formed her company in 1955. Ross, *Experience as Dance*, 376-377 (note 31).

374 David W. Bernstein, ed., *The San Francisco Tape Music Center: 1960s counterculture and the avant-garde* (Berkeley: University of California Press, 2008), 225. See also pp. 268 and 269.

375 Bernstein, *Tape Music Center*, 222.

376 Bernstein, *Tape Music Center*, 82 and Ross, *Experience as Dance*, 173.

377 Although Five-Legged Stool was a collaborative endeavor between Ann and Subotnick, the piece had first emerged from the work Ann did with Terry Riley. It was first performed as *Four-Legged Stool* in 1961 to Riley's *Mescalin Mix* (1960-61), a tape music piece that consisted of a 35-foot tape loop that stretched around the studio and was wound around several wine bottles that served as spindles. Cage's influence is evident in the fact that Riley had used chance to determine which pieces of tape would be spliced into the final loop, which included segments of blues piano performed by Riley and a woman laughing. During the performance, Riley adjusted the speed of the tape manually in a collaboration that harkened back to many the sessions in which they had collaborated in her studio during his tenure as co-musical director. Bernstein, *Tape Music Center*, 11, 212. However, the work was met with such an unfavorable reaction that Ann worked on it for another year before performing it again. When the piece premiered in 1962, it appeared under a new name, the "additional leg" implying the added work that had gone into it in the interim. Ross, *Experience as Dance*, 155, 161. The other major change was that it was no longer performed to Riley's music, as he had left the Bay Area early in 1962, but to Subotnick's. As mentioned earlier, Riley had left the Bay Area early in 1962. See Bernstein, *Tape Music Center*, 269.

378 These dancers were A. A. Leath, John Graham, and Lynn Palmer. Ross, *Experience as Dance*, 155.

tasks were chosen for various reasons but were all selected because they replicated events and movements from everyday experience. One such task involved Ann gathering 100 wine bottles from the wings of the stage, and handing them up to someone perched atop the rafters.[379] Other tasks were movement-based and sharply punctuated, such as when one of the dancers appeared in a dress shirt with tails and no pants, chasing after a bicycle wheel that spun across the stage. As soon as he caught the wheel, he would throw it again and repeat the sequence over and over again. In another task, another dancer combed her hair, ate grapes, and regarded herself in a hand-held mirror, all the while suspended in a balcony twelve feet above the stage.[380]

Five-Legged Stool was performed three times during its premiere, on three separate evenings. Although the tasks had all been rehearsed, their specific order changed in each performance. As Ann explained, "in the first act of *Five-Legged Stool* each person had several gambits that could be done in any combination, even though each time they had to be done the same way." She continued, "even though these things were repeated exactly the same way in every performance, their sequence changed so that the composition would be different for the audience and the performer. This was the first composition where we had a different performance every night."[381] This structure evolved from her desire to develop all the independent elements of the performance

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[379] "Yvonne Rainer Interviews Ann Halprin," *Tulane Drama Review* 10 no. 2 (Winter 1965): 147-148.

[380] Ross, Experience as Dance, 156.

[381] "Yvonne Rainer," 148.

separately: the tasks or content of the dance, the sound or music, and the vocal noises issuing from the dancers.[382]

Halprin developed a score for a portion of *Five-Legged Stool* that reflected not only his own involvement in Ann's evolving concept of choreography but also the synchronicity of their interests in experimenting with new systems of recording movement over space and time. (fig. 3.20) This score, like the fountain scores, moves from left to right and is based on a similar visual framework, particularly in regard to the added symbols so the left of the score. While each row on the fountain scores was devoted to a different water or lighting effect, each row of the score for *Five-Legged Stool* represents the actions of a different performer. The score is metered over time in increments and stretches over 95 minutes.[383] The score is instructive as it carefully maps out the location and activity of each of the 4 dancers, as well as the actions of the stage hand, who helped with task execution and prop placement. In each person's row, a solid line charts their location as it moves between dressing, backstage, pit, stage, proscenium, audience, and lobby, with most of the dancers crossing back and forth between all areas. Various symbols, given at the left side of the page, describe type and speed of movement (moving versus in place, fast/medium/slow speed, etc.), where on the stage they are to move, how high their action is to be performed relative to the stage floor, and the volume of sound they are to omit. In addition, specific tasks are described above each person's individual row as well as the timing of vocal emissions.

Interestingly, the controlled physical composition of the piece was paired with a

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[382] "Yvonne Rainer," 147.

[383] Despite the fact that the score stretches over 95 minutes, it appears to only contain a portion – perhaps only a single act – of the entire dance, as Ann's work with the wine bottles is nowhere evident in the score.

contrastingly open conceptual composition that did just the opposite of what such a seemingly tightly-controlled score might imply: it opened up the performance to the members of the audience through a focus on everyday task and movement and the intentional collapse of the spatial, aural, and temporal boundaries that traditionally existed between the performer and the audience. The way in which each task was performed in an intentionally unrelated way to the others only extended Ann's goal to remove any kind of predetermined conceptual objective from the dance: "There was an enormous amount of juxtaposition in *Five-Legged Stool* and it was done deliberately. There was an attempt to really break down cause and effect. I wanted everything to have such a sensory impact that an audience would not question why. I didn't want anything to look as if it had meaning, or continuity."[384] Ann's intention to involve the audience manifested not only in the way the piece's meaning was constructed, but also – and perhaps more obviously – in her approach to the space of the performance. She rejected the traditionally divided arena of the theater, in which the performers remained on the stage and the audience sat passively in the theater. It was of utmost importance to her that the audience members became active members in the performance, not only intellectually but also physically. She was "discouraged with having to be up there in that relationship to an audience," and "began to look at the lobby, the aisles, the ceilings, the floor," conceiving of the total space of the theater as the spaces of performance.[385] *Five-Legged Stool* was in fact one of the first times that Ann used the entire building, not just the auditorium, for the performance. As she explained, "We explored the entire

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[384] "Yvonne Rainer," 149.

[385] "Yvonne Rainer," 147.

theatre… the outside, the corridors, the ceilings, the basement, the aisles, everything. What happened was that the audience was in the center, and the performance went all around them. Above them and below them and in front of them, and outside, sometimes they would hear things out on the street."[386]

Halprin at Berkeley, 1962-63

More perhaps than his fountain scores, Halprin's involvement with scoring movement for Ann's choreographic scores led him toward an exploration of notation as a tool for recording motion through the landscape. It was at this time that Halprin entered into a relatively frequent teaching engagement at the University of California in Berkeley.[387] After a short stint at the Berkeley the previous decade in 1953,[388] Halprin

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[386] "Yvonne Rainer," 149.

[387] Signed employment forms for the University of California, Berkeley show that Halprin was employed as a lecturer in the Department of Landscape Architecture for the Fall of 1962, the Spring and Fall of 1963, and the Fall of 1964. Halprin also had a brief appointment in the same position from February to April of 1953. See: "University of California Employment Form, 7/2/62," Folder "Graduate Design Course – US Fall 1962 – lectures," call no. 014.I.A.6042; "University of California Change in Employment Status, 6/10/63" and "University of California Separation, 12/27/63," Folder "LH Design Class, U. Calif. Fall 1963 – Halprin lectures," call no. 014.I.A.6041; and "University of California Employment Form, 7/17/64," Folder "U.C. Design Course, 1964 – teaching, speaking," call no. 014.I.A.6040; all located in: Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania, Philadelphia (Halprin Collection).

[388] Halprin's association with Berkeley began in the early 1950s, when he was invited as a lecturer in the Department of Landscape Architecture for the spring semester of 1953. The appointment was of fairly short duration and consisted of teaching an eight-week course with H.L. Vaughan, then the Chair of Landscape Architecture. It does not appear that Halprin and Thiel met at Berkeley in the 1950s or 60s, as Halprin worked there in 1953 and from 1962-65, while Thiel was there from 1954 to 1959. See letters, H.L. Vaughan (Chair, Landscape Architecture Department at the University of California, Berkeley) to Larry Halprin, 23 January and 2 February 1953; Letter, George D. Mallory (of the Office of Secretary and Treasurer of the University of California, Berkeley) to Lawrence Halprin, 24 February 1953; both located in folder "Halprin Landscape Design Course - U.C.; office file, 1953," call no. 014.I.A.980, Halprin Collection. He also gave a lecture at Berkeley, as one of the featured events in first annual Arts Festival Week of 1958. The Festival ran from May 12-17 and was organized by Berkeley's College of Architecture. See "Ark Report: Arts Festival Week, May 12-17," College of Architecture, University of California, Berkeley, California, Folder "LH Design Class, U. Calif. Fall 1963 – Halprin lectures," call no. 014.I.A.6041, Halprin Collection.

returned to the Department of Landscape Architecture in Berkeley's College of Environmental Design in 1962 and continued to teach there relatively regularly through January of 1965, applying the lessons he had taken from garden design to the larger public and urban realm.[389] Initial correspondence between Halprin and Francis Violich, the Chair of the Department of Landscape Architecture at Berkeley, suggests that Halprin had been thinking about developing some kind of movement notation as early at the summer of 1962 and that fall, Halprin began to teach a studio class to a core group of advanced graduate students that sought to develop such a system.[390]

An early assignment sheet/syllabus from the class, written by Halprin and fellow instructor Robert Perron, immediately engaged the students with the question of how to notate movement and spatial experience. Titled "Recording of Actual and Perceptual Events," the sheet asked the students to consider three key issues: the notation of movement, the recording of spatial experience, and the description of sensorial

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[389] From the fall of 1962 through the fall of 1964, Halprin taught as a Lecturer in the department at Berkeley over the course of five semesters. Due to the fact that teaching had to be balanced along with full-time professional practice, Halprin's appointments and duration of engagement varied over this time. After his first semester, in which he taught an intensive semester-long schedule over the course of fifteen weeks, Halprin restricted his teaching commitment to smaller projects that were finite and could be completed in a short and concentrated period of time, usually three to six weeks in duration. See the following, separated by term: **Fall 1962**: Letter, Francis Violich to Lawrence Halprin, 11 July 1962, Folder "Graduate Design Course – US Fall 1962 – lectures," call no. 014.I.A.6042, Halprin Collection; **Spring 1963**: Letter, Lawrence Halprin to Francis Violich, 15 January 1963, Folder "Graduate Design Course – US Fall 1962 – lectures," call no. 014.I.A.6042, Halprin Collection; and Assignment Sheet for Landscape Architecture 298, Spring Semester 1963, 19 March 1963, Folder "Motation," call no. 014.I.A.5132, Halprin Collection; **Fall 1963**: Letter, Francis Violich to Larry Halprin and Bob Royston, Folder "LH Design Class, U. Calif. Fall 1963 – Halprin lectures," call no. 014.I.A.6041, Halprin Collection; **Spring 1964**: Letters, Lawrence Halprin to Robert Tetlow, 3 January 1964 and R. Burton Litton to Lawrence Halprin, 24 January 1964, both in Folder "LH Design Class, U. Calif. Fall 1963 – Halprin lectures," call no. 014.I.A.6041, Halprin Collection; **Fall 1964**: Letter, Francis Violich to Lawrence Halprin, 20 July 1964, Folder "U.C. Design Course, 1964 – teaching, speaking," call no. 014.I.A.6040, Halprin Collection.

[390] In a letter dated 11 July 1962, Violich wrote, "Ever since our discussion on your lunch deck I have continued to be stimulated by the prospects of your developing your particularly interesting concept by working with our students next Fall." (See letter, Francis Violich to Lawrence Halprin, 11 July 1962, Folder "Graduate Design Course – US Fall 1962 – lectures," call no. 014.I.A.6042, Halprin Collection.)

information.[391] The students were asked from the beginning to consider how speed and means of movement could impact the process of notation: "How can one register visual experiences in understandable symbolic form in detail, while driving at various rates of speed…. [or] Record the mental impression, gained from the same objects or object, moving and stationary, while driving at different speeds?" The students were asked to "symbolize the sense of speed," a complex problem that asked them to consider a mechanism for conveying not only progression through time and space but also the spatial sensation of such a progression, including sensations of horizontal and vertical enclosure.[392] Finally, Halprin and Perron asked whether it was "possible to symbolize this kind of motion so that it can become familiar to others"[393] and how the student might resolve potential "personal conflict between what is seen and what is felt in the symbolized recording of events."[394]

In order to help the students prepare for these tasks, Halprin and Perron introduced them to the current literature, circulating a partial bibliography to the class fairly early in the semester. The list included readings that raised questions about the nature of visual perception in motion, urban mapping, and the relationship between time and space, concepts that were all central to the task of building a system of movement notation. Students were asked to read László Moholy-Nagy's *Vision in Motion*, Gyorgy Kepes's *Language of Vision* and *The New Landscape*, Sigfried Giedion's *Space, Time*

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[391] Lawrence Halprin and Robert Perron, "Recording of Actual and Perceptual Events, Landscape Architecture 298, Fall Semester 1962," 10 October 1962, Folder "Graduate Design Course – US Fall 1962 – lectures," call no. 014.I.A.6042, Halprin Collection.

[392] Halprin and Perron, "Recording," 1.

[393] Halprin and Perron, "Recording," 1.

[394] Halprin and Perron, "Recording," 1.

and Architecture, as well as Kevin Lynch's *Image of the City*.[395] Other texts, reviewed and summarized by the students, included anthropologist Edward T. Hall's *The Silent Language*, which analyzed the relationship between environment and behavior; Ann Hutchinson's text on dance notation, *Labanotation*; and Gyorgy Kepes's "Notes on Expression and Communication in the Cityscape," an essay exploring the ways urban form is visually and symbolically conveyed.[396]

Over the course of the fall semester, Halprin, Perron, and the students progressed from the tasks initially laid out in the syllabus to the completion of a true system of movement notation, captured in a class project titled *Score from San Francisco to Sausalito* (hereafter SF Score). The major product of the fall semester, the SF Score is an enormous fold-out document, over two feet wide and almost 24 feet long.[397] (fig. 3.21) As the score progresses from left to right, it captures the experience of moving from the city of San Francisco to the town of Sausalito. The score is keyed to another drawing, the

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[395] See Lawrence Halprin and Robert Perron, "Partial Bibliography, Landscape Architecture 298, Fall Semester 1962," 26 September 1962, Folder "Graduate Design Course – US Fall 1962 – lectures," call no. 014.I.A.6042, Halprin Collection.

[396] See three type-written summaries of these texts in one of Halprin's class folders on "Motation," which appear to have been written by three different students in the class, although only one (the summary of Hall's book) lists an author. See Robert W. Tyler, "Summary: The Silent Language, by Edward T. Hall," November 1962; "A Summary of Ann Hutchinson's Book, 'Labanotation;'" and Summary of "Notes on Expression and Communication in the Cityscape;" all located in Folder "Motation," call no. 014.I.A.5132, Halprin Collection.

[397] *Score from San Francisco to Sausalito*, sepia print (recto and verso) on brown vellum with additions in graphite, Fall 1962, Class project at University of California, Berkeley; Instructors: Lawrence Halprin & Robert Perron; Students: Dick Jongejan, John McCallum, Juan Rohl, James Taylor, Ronald Thurber, Robert Tyler, Antonio Vegas; Large drawings file "Motation System," call no. 014.II.A.114, Halprin Collection. These students all appear on the class roster for the fall semester of 1962, in addition to two others. Of the nine advanced graduate students on the class roster, Dick Jongejan, Juan Rohl, Jim Taylor, Robert Tyler, and Antonio Vegas were in Landscape Architecture, John McCallum was in City and Regional Planning, Ronald Thurber and Phil Steele were in Architecture, and Charles Fountain was an auditor. It is unclear what kind of long-term involvement Steele and Fountain had in the class; although their names are on the roster, they do not appear in the list of names on the original score, or in credits for the Score in *Cities*. "LA 298 Student Roster, Fall Semester, 1962," Folder "Graduate Design Course – US Fall 1962 – lectures," call no. 014.I.A.6042, Halprin Collection.

Main Track, which depicts a large map of the region between San Francisco and Sausalito, located just north of the city across the Golden Gate Bridge. (fig. 3.22) Both the score and the *Main Track* are annotated with capital letters from A through G, allowing the reader to coordinate progress along the former with the path indicated on the latter. As shown on the *Main Track*, the trip began at Marina Park on the northern tip of the City of San Francisco, headed due west past the Yacht Harbor and then north on to the Golden Gate Bridge. After crossing the bridge, the path diverged northeastward from the Redwood Highway on to Sausalito Lateral and into the town of Sausalito. The road, which turned into Bridgeway Boulevard, followed the coast northward and ended between Sausalito and Marin City, the next town to the north.[398]

The score is divided into two separate tracks: one for horizontal objects and events and another for the vertical. Each one of these tracks follows a centerline that represents the straight ahead gaze of the individual, with objects noted to the left and right according to where they were experienced in real space. As Halprin wrote of this score, "it resembles, basically, the fixed position of a ship delineated on a radar scope, with other objects always plotted relatively to the ship as the center. But in this case, the center is drawn as a moving horizontal line and the projected environment is plotted at right angles to the right and left."[399] Along the two tracks of the SF Score, objects seen

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[398] It is unclear why this particular track was chosen, or why Sausalito was chosen as an end point. *Main Track*, n.d. (c. fall 1962), Class project at University of California, Berkeley; Instructors: Lawrence Halprin & Robert Perron; Students: Dick Jongejan, John McCallum, Juan Rohl, James Taylor, Ronald Thurber, Robert Tyler, Antonio Vegas; Large drawings file "Motation System," call no. 014.II.A.114, Halprin Collection. Although this document is not marked with a date, it clearly accompanies the SF Score and can thus be reliably dated to Fall 1962.

[399] Halprin, *Cities*, 209. Like the fountain notation, the SF Score and other early movement notation scores created for this class were intended to be read from left to right along a time scale marked on the horizontal axis. However, in goal and objective, these early scores were more akin to the Motation, even though the latter was read from the bottom of the page upward. As such, they represent Halprin's first attempts to

along the horizontal and vertical are represented by simple line silhouettes. The objects are classified into the following categories: rock outcrop, landform, vegetation, structures, water, or boats. Each category is represented by a simple solid shape, which appears to have been stamped on to the score: landforms are circles, vegetation is a triangle, structures are squares, and rock outcrops are diamonds. Water is indicated by a zig-zag and boats by a hemisphere topped with a cross (depicting a mast and crossbar).[400]

These object silhouettes are placed at a distance from the centerline that represents the perceived visual distance from the individual and persist for as long as the object's presence is felt. These silhouettes are drawn in one of three line patterns: solid to represent a foreground element, dashed to represent middleground, and dot-dashed to represent background. In reading the SF Score, it must be noted that the distinction between foreground, middleground, and background is one of the least intuitive aspects of the notation. Indeed, it was noted that "one of the greatest problems encountered in the notating process was the differentiating between foreground, middleground, and background," and that "the notation of the 'grounds' becomes especially difficult when they appear in a haphazard rhythm across the different scales that one encounters… in an urban scene, such as our notated track in San Francisco."[401] In order to establish criteria

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capture the experience of an individual's movement through the environment on paper and occupy a transitional space between Halprin's fountain notations of 1962-63 and his later "Motation" of 1965 (see Chapter 5).

[400] The visual language of the symbols used on these early scores can be understood as a prototype of the language used three years later in *Progressive Architecture*, evolving from a handful of signs into a 26-symbol alphabet.

[401] See "Movement Notation System," p. 1-2, Folder "Motation," call no. 014.I.A.5132, Halprin Collection. Although this document is unattributed, it was most likely written by Halprin and Perron as the instructors of the class. It recounts the details and benefits of the movement notation system and describes the process followed to create the score, as well as some of the obstacles faced and overcome. It is also undated, but as it is a review of the process and results of the class, it can be reasonably and reliably dated

for this aspect of his notation, the class defined the background as the horizon; in the event that the horizon was not visible, everything was either fore or middleground. By contrast, the foreground was the "first major group of elements defining the first system of space enclosure" and middleground was consequently "that which lies in the next plane beyond and which defined the next hierarchy of broad enclosure up to the point of horizon origin."[402]

The class produced the score in the field as a six-man team: "one man each for horizontal left and right, vertical left and right, special features, photographs and recording speed, and driver."[403] Although speed varied from section to section based on the degree of detail in the surrounding environment, the maximum speed used for main landscape features was 5mph in an urban environment, 10 mph in suburban, and 20 mph in rural. Relatively frequent pauses were made in the course of the journey, particularly in places where the scale and/or speed changed, so that the notator could review the recorded sequence and prepare for the next portion of the trip. This was meant to allow the entire team to correlate their findings to produce a consistent and reliable score.[404] In retrospect, the accuracy and efficiency of this methodology must be questioned, as the errors that would occur from combining the record of six individuals into a single track meant to convey the experience of a single person would be difficult, if not impossible, to

to the end of the fall semester of 1962, circa January 1963. The document refers several times to "our notated track in San Francisco" and clearly describes the notation as progressing horizontally from left to right, key features of the system developed by the LA 298 class in Fall 1962.]

[402] "Movement Notation System," p. 1-2, Folder "Motation," call no. 014.I.A.5132, Halprin Collection.

[403] "Movement Notation System," p. 3, Folder "Motation," call no. 014.I.A.5132, Halprin Collection. Although this document notes that photographs were taken, no such photographs have been found at the Halprin Archives.

[404] "Movement Notation System," p. 3, Folder "Motation," call no. 014.I.A.5132, Halprin Collection.

overcome. Perhaps in an attempt to minimize these errors, the class followed a set of rules, one of which stated that only major landscape elements were to be notated. Any qualitative observations "such as shimmering water, smell of a restaurant, etc." could be written on the score in the appropriate place.[405] However, one must question whether the required provision for supplementary textual notes revealed an early awareness that their proposed notation would be unable to capture all of the significant perceptual characteristics of the recorded journey and that whatever record resulted would necessarily vary based on which of the six notators were carrying out a given task.

Despite the fact that the SF Score was a fairly in-depth and time-intensive project, the resulting score was rather schematic and simplistic. The act of reducing the multitude of disparate buildings and structures to the same symbol and all landforms to another significantly reduced the information available in the final score. The two tracks were, moreover, rather difficult to combine and imagine as a single integrated experience in both the horizontal and vertical planes. Nevertheless, the notation can be seen as a significant first step on Halprin's journey of developing a notation system to record movement through space. Although The SF Score was a major product of the semester, in which the majority of the students participated, several smaller and more modest attempts were made by the students, either singly or in partnership, to develop a

[405] The other four rules addressed direction of view, speed of movement, and degree of specificity. First, notators were asked to orient their line of vision at right angles to the passing environment, perpendicular to the direction of travel. The only objects to be recorded were those that passed directly in front of the line of sight. The second rule regarded the speed of travel through the environment to be recorded, which would vary according to the degree of detail. In areas that were unfamiliar and highly detailed, a walking speed and multiple passes through the environment might be necessary, while areas of little detail or consistent character could be traversed at higher speeds. Another rule asserted that vertical and horizontal element should be penned as solids and voids, rather in elevation and plan, to capture overall rhythm and pattern. Finally, the last rule specified that all notations be recorded from left to right so that successive sheets could simply attach one to the next.[405]

movement notation. Never published, these scores were handwritten (rather than printed or stamped) and proposed more modest solutions to the questions posed at the beginning of the semester by Halprin and Perron.[406]

Teaching Notation at MIT and the Design of Ciudad Guayana

In the fall of 1962, while Lawrence Halprin was working with students at the University of California, Berkeley on the development of a movement notation, students at the Massachusetts Institute of Technology were being exposed to the basic elements of

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406 See Dick C. Jongejon and Antonio Vegas, Score and Main Track for an 11-mile trip; and Jim Taylor, Score for a 3800 foot trip; both located in: Folder "LH Design Class, U. Calif. Fall 1963 – Halprin lectures," call no. 014.I.A.6041, Halprin Collection. It is reasonable to assume that the other students in the class also produced their own scores of a similar nature, although this author found no physical record of them in the class files in the Halprin Archive. Both scores use the SF Score method of separating the journey into a horizontal and vertical track, although both proceed along a horizontal axis of distance progression rather than the SF Score method of time progression. Time is conveyed through the use of dots spaced along the distance increments of the baseline. Each dot represents a set amount of time so that the space between dots conveys the time taken to traverse a given section of the path. Dots spaced close together indicate that more time was required and denotes that a slower speed was employed for a given distance. Widely spaced dots indicate that less time was required and therefore that the speed was faster. This seems to have prefigured the method later adopted by Halprin in his 1965 "Motation," which used regularly spaced dots on a distance track and irregularly spaced dots on a time track that were read together to convey speed (see Chapter 5). Both the Taylor and the Jongejan-Vegas Score include two additional tracks at the bottom of the score: one for smell and another for sound. These two tracks paralleled the horizontal and vertical tracks above. In both scores, these two senses are conveyed by sine-curve-type amplitude along the track. Intense or powerful smells and sounds are described by greater amplitude; background or insignificant smells and sounds by a standard baseline amplitude. In the SF Score, these two tracks were eliminated in favor of textual comments in the event of particularly strong non-visual sensorial information along the journey. Otherwise, the Jongejan-Vegas and Taylor Scores are rather different. The former is for an 11-mile journey measured in 1-mile increments while the latter covers roughly ¾ of a mile with increments marked every 200 feet. As a result, the Jongejan-Vegas score conveys less detail for the same distance than the Taylor Score but describes more of a journey, while the Taylor score instead focuses on more minute details. The symbols used in the Jongejan-Vegas score bear strong visual resemblance to those used in the SF Score, with mountains represented by circular outlines, trees by triangles, rocks by diamonds, structures by squares, and so on. The Taylor score instead uses letters to indicate major forms: L for land forms, P for plant masses, A for Architectural forms, and W for water. In terms of framework, the Taylor score splits the Vertical track into two subsidiary tracks (for vertical-left and vertical-right) placed on either side of the horizontal track while the Jongejan-Vegas score retains the integrity of the vertical track as a whole. Although it was the Jongejan-Vegas method that was also used in the SF Score, it must be noted that the Taylor method is significantly more intuitive, as the split vertical tracks enable the reader to combine the information from the horizontal and vertical tracks more easily. It must be noted that the Jongejan-Vegas score was accompanied by a main track in the class files of the Halprin Archive while no such main track was identifiable or found by the author for the Taylor score. It is likely that one existed; however, its whereabouts remain unknown.

a movement notation in a workshop class taught by Donald Appleyard . The subject of this workshop class was the planning and design of the new industrial city of Ciudad Guayana, located in the Guayana region of Venezuela. Appleyard was a consultant on the Ciudad Guayana project as part of a larger group from the Joint Center for Urban Studies of MIT and Harvard that was instrumental in the design of the finished city. The Joint Center, which had been established in 1959 as a cooperative venture between the two universities, was a research institution that drew faculty and graduate students from fields as diverse as economics, law, philosophy, and education, as well as architecture, city planning, and urban design.[407] Initially funded by a grant from the Ford Foundation, the Center quickly became a world-renown and highly influential center for research into issues of urban design, policy, and education. It had three stated purposes: "to improve fundamental knowledge about cities; to build a bridge between basic research and policy; and to enrich the teaching programs and research opportunities at the two universities."[408]

In the early 1960s, The Corporación Venezolana de Guayana (CVG) asked the Joint Center to consult on the development of Ciudad Guayana and, more broadly, the entire Guayana region of Venezuela. Various settlements had been developed by mining companies in the area since the 1940s, when iron ore was first discovered, transforming an area that had been previously populated mainly by small fishing villages. The Joint Center sent a multidisciplinary team to join the CVG in Caracas, forming a planning

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[407] Michael Churchill, "Harvard, M.I.T. Establish Center To Conduct Broad Urban Studies," *The Harvard Crimson* (Online Edition), February 27, 1959, accessed May 5, 2010, http://www.thecrimson.com/article/1959/2/27/harvard-mit-establish-center-to-conduct.

[408] Mary L. Wissler, "Building Cities, Bridging Gaps," *The Harvard Crimson* (Online Edition), May 12, 1965, accessed May 5, 2010, http://www.thecrimson.com/article/1965/5/12/building-cities-bridging-gaps-pacross-the/.

group consisting of engineers, architects, transportation planners, economists, city planners, landscape architects, and urban designers.[409] Appleyard was a consultant to the Joint Center group from the beginning of the project, visiting Caracas for the first time in the summer of 1961 and spending the following three summers in Venezuela on the project.[410] During the fall of 1962, Appleyard led a workshop at MIT devoted to the design of Ciudad Guayana, which was the main city being planned by the team from the Joint Center. This workshop on Ciudad Guayana taught by Appleyard in the fall term of 1962 was likely part of the new joint design program bringing together graduate students in the two departments of Architecture and City and Regional Planning at MIT, a curriculum innovation initiated by Lynch and Appleyard in 1962.[411]

In this workshop, students developed various schemes that examined the future planning and proposed long-range alternatives, which Appleyard in fact carried with him on a trip to Caracas in March of 1963 to share with CVG officials.[412] One such scheme,

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[409] Donald Appleyard, *Planning a Pluralist City: Conflicting Realities in Ciudad Guayana* (Cambridge, MA: MIT Press, 1976), 9-10.

[410] Appleyard, *Pluralist City*, Acknowledgements (n.p.).

[411] As noted in the MIT Bulletin of 1962: "The program included a new fall term collaborative design workshop with graduate students in architecture and a pioneering spring term workshop for five advanced planning students." *MIT Bulletin, President's Report Issue* 98 no. 2 (November 1962): 49. A bulletin from the following year, 1963, noted that "The large regional and city planning project in Venezuela has directly aided the Department through use of subject matter and materials in workshop courses taught by Professors Appleyard" and others, indicating the crossover at MIT between professional practice and graduate education. *MIT Bulletin, President's Report Issue* 99 no. 2 (1963): 52.

[412] Donald Appleyard, "CVG Staff Working Paper: Visit to Caracas, March 14-19 1963, File no. E-77, May 8, 1963," AC 292, box 3, folder "E70-E85," Records of the Guayana Project, Joint Center for Urban Studies of the Massachusetts Institute of Technology and Harvard University, Massachusetts Institute of Technology Institute Archives and Special Collections, Cambridge, MA. In this working paper, Appleyard notes one of the purposes of the visit was "to transmit and discuss the results of the MIT workshop problem on the Guayana problem carried out in the fall term 1962." In the memo, he writes moreover that "A presentation of the student work together with general conclusions was held on Monday March 18. This set of seven schemes proved useful in suggesting different long range alternatives. Our alternate program is also being considered by the group. Dr. Vegas asked for copies of the students' work in order to examine them at leisure. These are being sent to him." (see page 1 of report)

prepared by MIT student George Kurilko, included a preliminary version of a "space-motion diagram" for a journey along the major pathway of the city, the Avenida Guayana (fig. 3.23).[413] Arrows along the path indicated the direction of major views while the position of the observer within the relative proportions of the enclosing space was shown by cross-sectional diagrams that were keyed to specific moments in the overall journey.[414] Appleyard described Kurilko's sequential design as follows: "The principal aspect of sequential organization is the rhythmical shifting of direction which quickens as the road descends toward the city center. Coordinated with this movement are views of successive sub-centers approached on axis, then by-passed on alternate sides."[415] The description continued, "The diagonal changes in the direction of the route allow contrasting cross-views out over the valleys and rivers on either side. Thus the main entry and work route for the city would be clearly aligned, well oriented to the focal pattern of city centers, and yet offering a clear sense of the relation between the two rivers and the falls. Besides this it holds the potential of being a stimulating experience."[416] This notation is rather rudimentary and splits the journey into successive portions rather than drawing it together in a continuous fashion; however, it can be

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[413] In *The View from the Road*, published two years later, a slightly different version of a "space-motion diagram" was published as part of their notation system (see Chapter 4).

[414] Appleyard, *Pluralist City*, 187. Note, in particular, Figure 8.31, although Figures 8.29 and 8.30 were also both prepared by Kurilko. Although these drawings were not published until 1976 in *Pluralist City*, the caption on the figures note that they are "illustrations from a student sketch plan (G. Kurilko, M.I.T. student, 1962) made early in the project under different economic assumptions [that] serve as an example to show how each urban element can contribute to the structuring of a new city." (187)

[415] Donald Appleyard, "Motion, Sequence and the City," in *The Nature and Art of Motion*, ed. Gyorgy Kepes, 176-192 (New York: George Braziller, Inc., 1965), 190. See 191 for reproduction of Kurilko's sequence diagram, although it is not accompanied by the "goal sequence" or cross-sectional diagrams indicating the observer's position within the space that are included in the reproduction in *Pluralist City*.

[416] Appleyard, "Motion, Sequence," 190.

considered an early attempt to record space and motion along a pathway at various moments in time.

It is interesting to note that Kurilko himself wrote to Halprin twice between 1962 and 1963 to request "prints of the sequence notation score" that Halprin had been developing as part of his design class.[417] Although it does not appear that the exchange was made, there was clearly interest at MIT about Halprin's work on sequence notation.[418] Although Appleyard and Lynch had developed their movement notation in the late 1950s and Halprin was only just beginning to do so in 1962, it is nevertheless intriguing that studio classes were being held in the same semester at both MIT and Berkeley on the same topic of movement notation in urban design.[419]

Although it is unclear whether any other notations were developed for the design of the new city of Ciudad Guayana,[420] many of the same concepts discussed in the MIT

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[417] Although this letter is dated 1 February 1963, it refers to correspondence from the previous October in which Kurilko had first made the request. Kurilko notes Halprin's return letter from the same period and writes, "From your return letter of October 11th I understand that some of this work and the work of your design class may be available at about this time." A response to Kurilko from Halprin's office, dated 20 February 1963, indicates that "the sequence notation score is 'not yet ready'." Although the date on the score makes clear that the score was indeed ready at this point, it is reasonable to assume that Halprin was not yet ready to share the score, as it was at that point being prepared for publication in *Cities*, which was scheduled to go to press later in the year. See: Letter, George Kurilko to Lawrence Halprin, 1 February 1963; and Letter, Leslie Schenk (Secretary to Mr. Halprin) to George Kurilko, 20 February 1963; both located in Folder "Graduate Design Course – US Fall 1962 – lectures," call no. 014.I.A.6042, Halprin Collection.

[418] It is possible that Halprin did not make this exchange because of the impending publication of the print in *Cities*, Halprin's book of 1963.

[419] The author has been unable to find any documentation that Appleyard and Halprin corresponded, so it seems at the very least nothing but a remarkable coincidence that design studios were held during the same semester at both schools on the same topic.

[420] While it is possible that Appleyard used the notation in the design of Ciudad Guayana, this author has been able to find little evidence in the archival record of the Ciudad Guayana project at the MIT Archives and Special Collections. If notational scores exist, it is likely that they would be housed with the main body of Appleyard's archive at the University of California, Berkeley (See Donald Appleyard Collection (2010-4), Environmental Design Archives, University of California, Berkeley). The only other published images in *Pluralist City* that appear to use elements of notation are Figure 8.6 (showing view corridors,

Team's earlier "Imageability study of highways" appeared in one of Applyeard's unpublished reports on "The Future Form of Santo Tomé" from December of 1962.[421] In this report, Appleyard called for the development of a graphic technique that could be used to evaluate and compare alternative designs for the city.[422] Among the diagrams he suggested on developing were those devoted to assessing the perceptual pattern of the city. These included diagrams of sequence, space, motion, and orientation along major paths, as well as locations of the five major city elements explicated by Lynch in his *The Image of the City* from 1960: paths, edges, districts, landmarks, and nodes.[423] Appleyard echoed the conclusion of his earlier work with Lynch on the Imageability study of highways when he wrote that the perceptual pattern of the city "occurs primarily along the path system, where most people travel. Viewpoint and sequence are therefore basic aspects of the perceptual pattern. Unless we know what is happening along the sequence structure, we have no way of clearly telling how the city will look from the ground, or whether it will satisfy our objectives."[424]

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spatial and visual enclosures, and the locations of urban development and natural features) and Figure 8.19 (illustrating clarity of orientation and direction along the Avenida Guayana, major views, and barriers); however, both of these figures are undated in the book (see pages 169 and 176, respectively).

[421] Ciudad Guayana was formerly known as Santo Tomé de Guayana. See "Ciudad Guayana," *Encyclopedia Brittannica Online*, accessed May 5, 2010, http://www.britannica.com/EBchecked/topic/119131/Ciudad-Guayana.

[422] Donald Appleyard, "The Future Form of Santo Tomé, December 1962," Kevin Lynch Papers, MC 208, unprocessed box 6, folder "Guayana," Lynch MSS, 1, 4.

[423] In this text, Appleyard also refers to the forthcoming publication of *The View from the Road*. Appleyard, "Future Form," Lynch MSS, 5.

[424] Appleyard, "Future Form," Lynch MSS, 4.

The Continuing Debate on Aesthetics and Highway Design, 1963

The year after Applyeard's workshop class on Ciudad Guayana, the MIT Team's notation was published for the first time when extracts of their forthcoming monograph, *The View from the Road*, appeared in articles of the same title in two different journals. The first, from January of 1963, was published in *Highway Research Record* as part of a series of technical reports on the highway.[425] The second was included in an issue of *Architectural Forum* from October of 1963 dedicated to transportation and the city.[426] Both brief articles presented conclusions from the Imageability study of highways, from the basic principles underlying the visual analysis of a highway to the role of the urban highway as an ordering force in the larger urban environment. (see Chapter 2). Their study of the Inner Belt highway in Boston and their proposed visual redesign of the project was summarized in brief in both articles and illustrated with sketches of their nascent notation system. However, these sketches were left largely unexplained, which would likely have been both unsatisfying and bewildering to the contemporary reader, although it is possible that such excerpts were chosen to stir interest in the forthcoming publication of their book.[427]

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[425] Donald Appleyard, Kevin Lynch, and John Myer, "The View from the Road," Highway Research Record No. 2 (1963).

[426] Donald Appleyard, Kevin Lynch, and John Myer, "The View from the Road: A Highway Redesigned for the Drama of Driving," *Architectural Forum* 119 (October 1963): 61-94.

[427] While general conclusions about the role of the highway in urban form perception were discussed, as well as factors in visual redesign (rhythm, tempo, pattern, etc.) the articles were rather schematic in that they presented the author's proposal for the visual redesign of the Inner Belt rather quickly without explaining the mechanics of the notation system, as they did the following year in their book. As such, the relevant content will be discussed in chapter 4, which addresses *The View from the Road* of 1964. The articles are noted here to show how the MIT authors' discussion of highway aesthetics fit into the larger, ongoing discussions of the time period.

These early publications on “The View from the Road” continued the aesthetic debates on the design of the highway from the late 1950s and early 1960s (discussed in Chapter 2). Published the same year as the early articles by Lynch, Appleyard, and Myer on “The View from the Road” was *Man-Made America*, a book co-edited by landscape architect Christopher Tunnard and regional planner Boris Pushkarev, mentioned earlier, that went on to win a National Book Award.[428] The chapter prepared by Pushkarev in the book, titled “The Paved Ribbon: The Esthetic of Freeway Design,” gathered together all the concepts presented in the articles Pushkarev wrote and published between 1960 and 1962 (see Chapter 2), augmented his discussion on internal and external harmony, and presented extended observations and historical analysis of the development of the form of the freeway and parkway.[429]

In 1963, the same year in which Tunnard and Pushkarev’s *Man-Made America* was published, a more thorough discussion of comprehensive planning and the application of the principles of the Complete Highway to urban artery construction appeared in *Highway Research Record*. Written by Joseph Federick, a district engineer for the New York State Public Works, the paper was titled “Aesthetic Considerations in Urban and Arterial Route Planning.” Federick argued that, given the leadership role of engineers in planning urban roadways, it was imperative that the profession make an effort to understand urban growth and development patterns, particularly in light of the significant effect of highway construction on community structure. In discussing the

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[428] Christopher Tunnard and Boris Pushkarev, eds., *Man-Made America: Chaos or Control?* (New Haven and London: Yale University Press, 1963).

[429] See Boris Pushkarev, “The Paved Ribbon: The Esthetic of Freeway Design,” in *Man-Made America: Chaos or Control?*, ed. Christopher Tunnard and Boris Pushkarev, 157-275 (New Haven and London: Yale University Press, 1963).

principles of The Complete Highway in urban settings, however, Federick noted that "the cult of beauty is suspect. Aesthetic tendencies in engineering are taken as indicators of Sybaritic excesses." He argued that man-made constructions should respect the integrity of the natural environment.[430] Surface highways had to be completely integrated with the surrounding grid, "possessing fluidity of section and alignment, and harmony with the environment. This total integration is a fusion of the dynamic and the static. The canvas is a continuous one; the backdrop everchanging."[431] Roadside parks, complete with pathways and sitting areas, would improve the connection between road and environment.[432]

This total integration demanded the participation of landscape architects. Federick called particular attention to aesthetic elements achievable through principles of landscape design, including balance, proportion, rhythm, and sequence. These principles, he continued, "help organize space into pleasing relationships. Masses of data cannot be fed into computers that will automatically create the perfect landscape design."[433] Although the engineer's survey revealed locations of natural features and man-made structures, the landscape architect should be involved from the beginning, noting adjustments to curvature and alignment and recommending aesthetic improvements through sequential awareness of important landmarks, conservation of natural resources,

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[430] Joseph C. Federick, "Aesthetic Considerations in Urban and Arterial Route Planning," *Highway Research Record* no. 23 (1963): 28.

[431] Federick, 31.

[432] Federick, 29.

[433] Federick, 31.

and incorporation of wooded shelters and open spaces.[434] Indeed, that same year, in 1963, landscape architect Bradford Sears wrote an article titled "Education and Recruitment of Landscape Architects for Highway Organizations," in *Highway Research Record* to make a case for including the landscape architect early in the planning process, rather than as a specialist brought in after the fact to create a "green mantle" to ameliorate visual shortcomings.[435]

Halprin: Freeways and *Cities*, 1963

In 1963, Halprin himself began to publish substantive text on his philosophy of design for urban freeways. He had been hired in 1962 as a consultant by the State of California Department of Highways "to improve the design of San Francisco's proposed, controversial freeways."[436] As noted in Chapter 2, San Francisco was one of the large cities – along with New York City and Boston – that became involved in urban highway construction long before the passage of the Interstate Highway Act of 1956.[437] A state freeway plan for San Francisco from 1951 called for 25 miles of elevated superhighways intersecting in a grid over the city; in 1952, the California Highway Commission voted to

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[434] Federick, 31.

[435] Bradford G. Sears, "Education and Recruitment of Landscape Architects for Highway Organizations," *Highway Research Record* no. 23 (1963): 19-21. It is interesting to note that in 1968, a group of students in Harvard University's Department of Landscape Architecture prepared a report for The Bureau of Public Roads of the Department of Transportation titled *Highway Esthetics: Functional Criteria for Planning and Design*. The publication analyzed the esthetic highway as a product of comprehensive highway planning and addressed issues such as the visual perception of the highway, the driver/vehicle/highway environment system, and the visual sequence of the roadway. See Peter Hornbeck, *Highway Esthetics: Functional Criteria for Planning and Design* (Cambridge, MA: Landscape Architecture Research Office of the Harvard University Graduate School of Design, 1968).

[436] "Halprin Accepts Freeway Challenge in San Francisco," *Architectural Forum* 116 (April 1962): 13.

[437] Mel Scott, *American City Planning Since 1890* (Berkeley: University of California Press, 1969) 586.

expedite construction of the Embarcadero, a harborside expressway that would cut off the city's view of the bay. The state refused to consider alternate city proposals for a depressed or underground roadway and forged ahead with construction, breaking ground in 1956.[438] Although the Embarcadero had initially been proposed as a single-deck, six-lane elevated structure, updated traffic demand estimates forced the expansion of its design into a double-deck, eight-lane structure.[439] The state held fast to its plans over the following two years, publishing an updated 1958 plan that reiterated its desire to build all 25 miles of the elevated highways originally proposed for San Francisco. (fig. 3.24) By 1959, the state's refusal to consider alternate proposals for the Embarcadero and its continued insistence on pushing highways through the city instigated such intense citizen protest that the City's Board of Supervisors voted to halt construction on seven new freeways, rejecting the state's proposal outright.[440] This rejection had the effect of also turning away millions of dollars of federal highway aid, since, after the passage of the Interstate Highway Act of 1956, many of the state's proposed highways for San Francisco became eligible for 90% federal funding (see Chapter 1). In 1962 area citizens formed the California Citizens Freeway Association, which supported legislation that would not only halt work on the Embarcadero, but moreover tear it down.[441]

Perhaps seeking to improve their public image as well as their proposed highway plans, the state hired Halprin this same year in 1962 to prepare landscape studies for two

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[438] Johnson, "Captain Blake," 61-63.

[439] Ben Kelley, *The Pavers and the Paved* (New York: Donald W. Brown, Inc., 1971), 96.

[440] Bernard J. Frieden and Lynne B. Sagalyn, *Downtown, Inc.: How America Rebuilds Cities* (Cambridge, MA: MIT Press, 1991), 45; and Johnson, "Captain Blake," 63. See also "Arresting the Highwaymen," *Architectural Forum* 110 no. 4 (April 1959): 93, 95.

[441] "Freeway Fighters," *New York Times*, April 29, 1962.

major freeway connections to the Golden Gate Bridge: the above ground Panhandle Parkway and the buried Crosstown Tunnel.[442] Halprin began to develop a series of criteria for integrating highways and structures, making the case that highways should be made part of the urban fabric. Among Halprin's recommendations were that highways should go between, rather than through neighborhoods; that freeways should take as little viable land as possible through a combination of depressed and elevated structures; that buildings be integrated into, above, and across their structures; and that parks and playgrounds be built under them.[443]

The criteria Halprin began to develop for the sensitive incorporation of urban high-speed roadways appeared in his first book, *Cities*, in 1963. The production of this text, in which many of his notations were first published, was a major event for Halprin and his professional practice.[444] In microcosm, the book is about all the elements of the

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[442] "Lawrence Halprin on Freeways," *Architecture/West* (July 1965): 18.

[443] "Modern Living: The City, Where the Cars Are," *Time*, November 1, 1963, 64; "Lawrence Halprin on Freeways," 18-20; Mel Wax, "Expert Foresees a Carless City," *The San Francisco Chronicle*, Tuesday, November 12, 1963.

[444] The concept for the book was first suggested to Halprin in April of 1962 by Thomas Creighton, editor of *Progressive Architecture*. By this date, Halprin already had a relationship with the journal, which had published one article authored by Halprin in 1958, another co-authored by him in 1960, and two pieces on Capitol Towers, which received the journal's first ever Design Award in 1959. See Halprin, "Structure and Garden Spaces Related in Sequence," *Progressive Architecture* 39 no. 5 (May 1958): 95-103; Halprin, James C. Rose, and Karl Linn, "Houses and Landscapes," *Progressive Architecture* 41 no. 5 (May 1960): 140-143; "First Design Award: Capitol Towers, Sacramento, California," *Progressive Architecture* 40 no. 1 (January 1959): 106-111; and "Diversifying the Redevelopment," *Progressive Architecture* 43 no. 3 (March 1962): 143-147. Reinhold Publishing Corporation published *Progressive Architecture* as well as books on architecture; in collaboration with Jean Koefoed, Architectural Editor of Reinhold's Book Division, Creighton invited Halprin to produce a book on a new approach to landscape architecture, specifically on the "truly dynamic relationship" between landscape and architecture "where each acts in equipoise or counterpoise to the other." Halprin replied enthusiastically soon after, writing that Creighton's "idea of the true relationship between landscaping and architecture seems an intriguing subject, especially… those most important areas of inter-relationship which are neither one nor the other but are combined into urban and town complexes." Letters, Thomas H. Creighton to Lawrence Halprin, 20 April 1962; and Lawrence Halprin to Thomas H. Creighton, 3 May 1962; both in Folder "Cities – General Correspondence (Library)," call no. 014.I.A.5891, Halprin Collection. Thus, the time between concept and production was only 18 months, a relatively fast turnaround in the world of book publication (*Cities* was

city – both small and large – that contribute to the sensory urban experience. In a section on "Urban Spaces," for example, Halprin examined major vs. minor plazas, streets, and waterfronts, while "Furnishing the City" discussed uses of benches, kiosks and clocks and "The Floor of the City" analyzed flooring materials from pebbles and cobbles to concrete and precast pavers. Each section was richly detailed with images of all sizes, from wide perspective views to intimate details, all captioned to provide the reader with the sensory impact of the element depicted.[445]

In macrocosm, however, *Cities* is nothing less than a summation of Halprin's conceptual approach as a landscape architect, applied to the problem of making cities an engaging, interactive, enjoyable, and understandable place for all its inhabitants. As he wrote in the prologue, "this book is about the landscape of cities… the open spaces, and what goes on in them. We will concentrate on the interstices of cities – as the matrix of urban life on the visual and physical qualities of the urban environment as a great form of

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released on Friday, 22 November 22 1963, as noted in the Invitation to publication party and book launch for Cities at Halprin's Office in San Francisco, Reinhold Publishing Corporation, Folder "Cities - review," call no. 014.I.A.5123, Halprin Collection). Although the final title of the book was simply *Cities*, one of the early (if not earliest) provisional titles was "The Landscape of the City," reflecting the generating concept of the landscape-architecture synergy as it played out in an urban setting (The contract for the book, accompanied by a letter dated 1 February 1963, lists the book titled as "The Landscape of Cities." Letter, Jean Koefoed to Lawrence Halprin, 1 February 1963; and "Publisher - Author Contract," Reinhold Book Division, Reinhold Publishing Corporation, returned to publisher by author on 14 February 1063, both in Folder "Cities and Freeways - Reinhold Publishing," call no. 014.I.A.5122, Halprin Collection.) Among the 144 titles considered for the book as late as June 1963 were word-phrases that ranged from "Cities as Works of Art," and "Cities as Process" to "Cities in Motion," "The Urban Kaleidescope," "Greenways and Freeways," "The Anatomy of the City," "The City Scene (or the City Seen)," and "Cityscape for Cities Sake." Book Titles, 4 June 1963, Folder "Cities - book titles," call no. 014.I.A.5125, Halprin Collection.

[445] Under "Water in the Square," discussed above in the review of fountain notation, Halprin evaluated not only programmable water effects, but also the experience of quiet vs. gushing waters, waterfalls, edges, jets, and bowls. Other sections in the book include "The Third Dimension," "Trees for All Seasons," and "The View from the Roof."

art, and try to discover those elements which contribute to this environment."[446] By breaking his analysis down into the smallest details, Halprin revealed how seemingly insignificant details could contribute to the overall experience of a city by either encouraging or stifling citizen participation, freedom of choice, and everyday enjoyment. Halprin's goal was to make not only designers, but also average citizens aware of the potentials of their environment. In an age of urban renewal, it was imperative for the city's users to be aware of their surroundings and realize the strength of their voices in encouraging the positive changes and protesting the negative.

In the last section of his book, on "Choreography," Halprin described his kinesthetic approach to urban design, emphasizing the incorporation of movement in all its speeds and modes: "A city is a complex, many-dimensioned elaboration of structures and spaces organized into rhythmical juxtapositions where events happen. And a city must be experienced through movement to come alive in its most unique sense."[447] Even at the speed of pedestrians, "who move at comparatively slow speeds, the environment relates to the person constantly in motion with a varied viewpoint and a constantly changing position. The essence of our urban experiences is the process of movement through a sequential and variegated series of spaces."[448] For the driver, however, "close-in detail gives way to large-scale impressions, telescoped in time and space, and different in impact" and "the mobile viewpoint actually becomes physically essential."[449] Halprin argued that the relationship between the highway and its urban environment was missing

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[446] Halprin, *Cities*, 7.

[447] Halprin, *Cities*, 193.

[448] Halprin, *Cities*, 194, 196.

[449] Halprin, *Cities*, 199.

in the practice of highway design, both in terms of the visual experience from the road and the physical presence of the roadway within the urban fabric.[450] The only way to reconcile the differences between the experiences of the pedestrian and motorist was to accept that all parts of the city should not be expected to fulfill all purposes. Although Halprin believed that, ultimately, cars should be banned from the city's center, he conceded that freeways would need to be built around the city. He argued that these should be built according to urban needs rather than based on the "rural or romantic"[451] model of the winding country road, whose wide rights of way, large sweeping curves, and gentle vertical undulation were destructive to the city fabric.

Notational Scores in *Cities*, 1963

Halprin believed that urban design for movement could be aided by his new movement notation system. He illustrated his system with a selection from his "Score from San Francisco to Sausalito," which had just been completed in the fall of 1962 as part of his class at Berkeley.[452] *Cities* also included an illustration of a notation prepared

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[450] Halprin, *Cities*, 199.

[451] Halprin, *Cities*, 202.

[452] The published score in *Cities* showed only the first half of the journey from San Francisco to Sausalito, ending just after the Golden Gate Bridge, and was actually a detail of the larger score described above that extended all the way into Sausalito. The shorter version of the score, also extant in the Halprin Archives, was most likely printed from the longer score for the purposes of reproduction in *Cities*. The shorter score was printed in blackline on white vellum and is much easier to read than the longer version of the score, which is a sepia print on brown vellum, recto and verso. The text was printed on the front while the score was printed on the back but was intended to be read from the front, through the vellum. For this reason, the score shows only faintly in the longer score and would have been difficult to reproduce in *Cities*. Thus, it is likely that the shorter version of the score was created from the longer for the purposes of reproduction. *Score from San Francisco to Sausalito*, sepia print (recto and verson) on brown vellum with additions in graphite; and *Score from San Francisco to Sausalito,* blackline print on white vellum, both: Fall 1962, Class project at University of California, Berkeley; Instructors: Lawrence Halprin & Robert Perron; Students: Dick Jongejan, John McCallum, Juan Rohl, James Taylor, Ronald Thurber, Robert Tyler, Antonio Vegas; Large drawings file "Motation System," call no. 014.II.A.114, Halprin Collection. While

by Halprin titled “Scores for Walks Through Capitol Towers” (hereafter Capitol Towers Score). The score was drawn by Dick Jongejan, one of the graduate design students in Halprin’s fall class of 1962, but produced in collaboration with Halprin.[453]

It is likely that this score grew from material developed in Halprin’s fall class of 1962 or his spring class of 1963.[454] Although the score is undated, it is likely that it was

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the longer score was complete by January 1963, if not December of 1962, the shorter score for publication in *Cities* may not have been created until later. As *Cities* was released in November of 1963, the shorter score would likely have been ready for publication by the spring or summer of that year. See Reinhold Publishing Corporation, Invitation to publication party and book launch for Cities at Halprin’s Office in San Francisco, 5-7pm, Friday, November 22, 1963, Folder “Cities - review,” call no. 014.I.A.5123, Halprin Collection; and Halprin, *Cities*, 208-209 and 224, illustration credits: “Class project at University of California, Berkeley; Instructors: Lawrence Halprin & Robert Perron; Students: Jongejon, McCallum, Rohl, Taylor, Thurber, Tyler, Vegas.” Although Jongejan’s name is misspelled twice in the credits of Cities as “Jongejon” (entry 477 for the SF Score & 481 for Capitol Towers), his name in the class roster and departmental directory, as well as his hand-written signature on the “Score for a Two-Minute Dance” and a score for an 11-mile trip (with Antonio Vegas, discussed later) appears as Jongejan.

453 Although this author has been unable to find the original print of the Capitol Towers score, its publication and reproduction in *Cities* in 1963 (on p. 212-13) was accompanied by the following credit: “Scores for walks through Capitol Towers by Lawrence Halprin. Drawn by Dick Jongejon.” (p. 224).

454 The spring semester class, which Halprin also co-taught with Perron, was of shorter duration and was devoted primarily to developing a series of symbols that could be used to modify the movement notation system that they had already developed. The spring semester assignment sheet states: “Last semester our investigation centered upon perfecting a graphic set of symbols which could be used as tools for recording and notating our physical environment. The ‘System’ finally evolved was one which attempted to record existing three-dimensional spatial characteristics, at a quantitative levels…. If we can broadly assume that this spatial notation system is adequate for rather detailed recording of existing physical environment situations, it must be assumed that it can be adapted or modified to be used as a tool for testing design decisions.” The instructors asked the students to begin with the “existing notation system as a frame” and to explore additions or modifications that would allow the designer to differentiate between existing conditions and proposed changes. They were to “invent a dynamic notation system for recording physical form which is able to predict and describe, with some degree of clarity and confidence, any change which he initial construct may experience over future time.” Assignment Sheet for Landscape Architecture 298, Spring Semester 1963, 19 March 1963, Folder “Motation,” call no. 014.I.A.5132, Halprin Collection. These modifications are all supplemental to the scores described above, none of which contains any symbols or notes attempting to distinguish between existing and proposed features. The spring semester class was greatly shortened and consisted only of a six-week problem to be completed by the students under the direction of Halprin and Perron (the assignment sheet was dated March 19 with the final project date of May 1). Halprin wrote a letter to Violich at the end of the fall semester in which he cited the incredible time commitment that had been required the prior fall and asked if he could, in the spring, “do a reduced schedule on the completion of our movement notation system. I understand that most of the graduate students want to continue on a one credit basis in this matter.” Letter, Lawrence Halprin to Francis Violich, 15 January 1963, Folder “Graduate Design Course – US Fall 1962 – lectures,” call no. 014.I.A.6042, Halprin Collection. In the landscape architecture department, the class LA 298 could be taken for anywhere between one to six credits or units, depending on the instructor, the tasks assigned, and the time commitment required; the fact that Halprin and the students both requested a one credit, shortened

produced in 1963, after the SF Score was completed but before *Cities* was released for publication. As it appeared in Cities, which was released in November of 1963, it was certainly created no later than the fall of 1963. The visual appearance of the score closely resembles the SF Score, from the use of broadly classified stamped symbol outlines to the progression of tracks in time increments stretching from left to right. As the SF Score seems to have been the earliest dated score and the major product of the fall 1962 semester, it is likely that the Capitol Towers Score was based upon it.

Unlike the SF Score, however, the Capitol Towers Score notated the movement through an actual project in construction for which Lawrence Halprin & Associates, Inc., was the consulting landscape architect.[455] Capitol Towers was an urban renewal project in Sacramento, CA, which involved the razing and redevelopment of a 4-block area of downtown into a single 12-acre plot for residential use.[456] The site plan mixed three high-rise residential buildings with multiple low-rise townhouses, staggered in irregular lines throughout the parcel. Included in the plan were courtyards, parks, common seating, and fountains. (fig. 3.25) Parking for low-rises was in cul-de-sacs while cars for high-rise residents could be left in one of three multi-level garages. The interior of the plan was left as pedestrian-only, with a central pathway leading to the shopping center on

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course is consistent with the "follow-up" nature of the spring semester class. F. Violich, Meeting minutes, "Faculty and Staff Meetings - Fall Semester 1962, University of California, College of Environmental Design, Department of Landscape Architecture," 20 September 1962, and "Course Assignments – Fall Semester 1962, Department of Landscape Architecture," 4 September 1962, both located in Folder "Graduate Design Course – US Fall 1962 – lectures," call no. 014.I.A.6042, Halprin Collection.

[455] While the Two-Minute Score was mentioned in class materials, no textual evidence has been found that the class, as a group, addressed the task of scoring for Capitol Towers. For this reason, the Capitol Towers Score seems to have been the most removed from the activities of the class and would have required the collaboration of his landscape architecture practice

[456] The project was developed by Roger Stevens and Jim Scheuer of Capitol Mall Redevelopment Corporation and was the first part of the city's larger renewal program for 15 blocks in its west end.

the west and downtown offices located generally to the east. The mixture of high and low-rise and emphasis on pedestrian circulation was lauded as innovative for its time and was the result of collaboration between the Redevelopment Agency, the developers, as well as the architects and consultants, who collectively decided to revise the initial plan of an all high-rise development early in the planning stages. Begun in 1957, by 1959 the project had already received the first design award bestowed by *Progressive Architecture*.[457]

The low-rise buildings, completed first in 1960, were designed by Edward Larrabee Barnes. Clustered in smaller areas within the site, the frame and stucco two-story structures were staggered to create an irregular façade line, lend more privacy to tenants, and open up breezeways between offset structures. These structures were intended for rental rather than sale and consisted primarily of one-bedroom apartments.[458] The bottom story apartment looked out on to private patios while the upper story apartment faced the opposite direction on to a central park-like area. The three high-rises, completed slightly later in 1965, were designed by the office of Wurster, Bernardi, and Emmons. Constructed of reinforced concrete, the high-rises principally contained efficiency units with balconies. Laundry facilities, community activity rooms, and lounge areas were included on the ground floors. In contrast with the open, shared, and breezeway-ventilated common areas of the low-rise townhouses, each of the three

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[457] For details on design and site plan, see "First Design Award: Capitol Towers, Sacramento, California," *Progressive Architecture* 40 no. 1 (January 1959): 106-111 and "Diversifying the Redevelopment," *Progressive Architecture* 43 no. 3 (March 1962): 143-147. For dates of design, construction, and completion, see "Chronology," 122; *Edward Larrabee Barnes, Architect* (New York: Rizzoli, 1994), 18; and Treib, *An Everyday Modernism*, n.p.

[458] A select number of these apartments were three-story and consisted of duplex nits.

courtyards of the high-rises had a sense of enclosure and defined character: one was designed around water, another as a quiet sitting area, and a third as a court of palm trees.[459]

The score that was produced for Capitol Towers consisted of four smaller, interrelated scores that described various walks down the central pedestrian ways stretching through the site.[460] Each score was keyed to the central site plan (in "Main Track" fashion) and consisted of a single horizontal track (including left and right). Two of the scores charted the experience of "Path A" from the edge of the site into the center, an area defined by low-rise townhouses to either side. (fig. 3.26) The other two scores recorded the journey over "Path B" through a central plaza with a large fountain and a 3x4 matrix of trees. (fig. 3.27) In each case (Path A and Path B) one score marked a direct route from point to point while another took a more circuitous or leisurely path. In the case of the two "Path A" scores, the first followed "A1," a straight path, while the second scored "A2," which curved in a continuous arc. In the case of "Path B," the score for "B1" cut straight through the plaza, bisecting it exactly, while the "B2" score began at the same point but circled around the fountain, stopped at a bench, traveled back through the trees, and then continued out of the plaza.[461]

Each of these four scores used the same visual language and framework of the SF Score, with the exception that only the horizontal track was shown; no vertical track was

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[459] "First Design Award: Capitol Towers," 109-111, "Diversifying the Redevelopment," 145, and *Edward Larrabee Barnes*, 18.

[460] Although this author has been unable to locate the original score, as noted above, it was published in *Cities* in 1963 along with a site plan of the 12-acre Capitol Towers redevelopment site. See Halprin, *Cities*, 212-213.

[461] Halprin, *Cities*, 212.

included. In each case, the horizontal track followed a centerline with left and right indicated to either side. Objects were represented by symbols such as circular outlines for fountains, triangular outlines for trees, narrow rectangles for benches, and stacked squares for buildings. In all four small scores, the journey followed set time increments, specified along the bottom of each score. Although all four scores were drawn on graph paper with similarly sized squares, they did not all follow the same time scale. Scores A1 and A2, for example, began and ended at the same point but followed different paths (straight and curved, respectively). As a result, A1 took only 90 seconds to traverse but A2 required 120 seconds. By marking A1 off in 30-second increments and A2 in 40 seconds increments, Halprin was able to use the same length of graph paper in each case and convey the effect of the overall journey. Scores B1 and B2, however, were both marked off in 20-second increments, with the result that B2 (a 140-second trip) was twice as long as B1 (70 seconds). Although B2 was indeed much more circuitous than B1, much of the difference between the two was due to an almost 30-second pause taken in B2 to sit on a bench in the middle of the journey.[462]

As Halprin wrote in the text accompanying these scores in *Cities*, the purpose of his notation in this case was to assess the impact of walking through two areas of the design. By scoring two variations of each path – a linear versus nonlinear approach – Halprin intended to provide visual evidence of "the variegated experience encountered in the nonlinear patterns A2 and B2," which were "readily observable through the notation system."[463] Interestingly enough, although no vertical track was included with this score,

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[462] Halprin, *Cities*, 212. By way of contrast, both SF Score and Two-Minute Score are set to a standard time scale, but the precise time increment is unspecified on each score.

[463] Halprin, *Cities*, 212.

this was by far one of the easiest of Halprin's early scores to read. It is possible that its clarity is due to the relative simplicity and reduced scale of the environment. Instead of a notation that attempted to record a long bus ride at changing speeds through city neighborhoods of various scales and styles, the Capitol Towers Score represented a slow walking pace through an enclosed housing project and park that had large sections of homogenous design. One wonders in retrospect whether the lack of a vertical score is the source of that clarity; without it, the reader is not left trying to integrate two disparate scores and is forced to accept that only information on the horizontal scale is given. If that is the case, however, then one must conclude that a notation that is easier to read when half the information is missing is not a notation that is either user-friendly or comprehensive.

Reviews of *Cities*

The reviews of Halprin's *Cities* were by and large positive and complimentary. Halprin's section on Choreography, which contained both the SF Score and the Capitol Towers Score, received the most comments among the reviews that followed the book's publication. It was called "a most remarkable chapter" in one review while another lauded it as a professional contribution.[464] Other positive reviews called particular attention to the section and praised his use of the term "choreography" as particularly appropriate to the act of designing the city for movement.[465] Designing the city to be

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[464] Alfred Frankenstein, "City Life Is Like a Symphony," *San Francisco Sunday Chronicle*, This World, January 26, 1964, 26, 29 and Philip Thiel, "Time and Place in the City: *Cities*," *Landscape* (Spring 1964): 45-46. Both in Folder "Cities - review," call no. 014.I.A.5123, Halprin Collection.

[465] Stanley M. Sherman, "Cities," *AIA Journal* 42 (April 1964): 64-65 and Wolf Von Eckhardt, "A City Should Be Gussied Up Creatively," *Washington Post*, December 29, 1963. For other positive reviews, see

more in sync with its moving, active citizens was indeed a central goal of Halprin's in many if not all of his urban design projects. In *Cities*, he made the case that his newly created system of movement notation could help other designers achieve the same goal by reorienting their approach to designing for movement and its attendant requirements. The book was reviewed, interestingly enough, by Philip Thiel himself in 1964 in the journal *Landscape*. In the review, Thiel focused on Halprin's *Score from San Francisco to Sausalito* and *Scores for Walks Through Capitol Towers* and wrote:

> He does make a professional contribution in his discussion of [movement], in terms of the new techniques needed for designers working kinesthetically. These techniques are the means by which the designer may transcend the mere piecemeal assemblage of discrete details, and be enabled to handle the dynamic experience arising from a sequential encounter with the environment. To illustrate his points, the author presents some strip-graphs which notate the lateral distance (or vertical profile) of selected objects in the landscape, related to a moving observer at successive moments in time. The author has been interested in this matter (which he calls choreography) for many years, and it is good to have his ideas in print. One hopes that [Halprin] will be able to extend his system of notation to include other attributes of experience.[466]

Halprin's Other Scores from 1963

Halprin's "Score for a Two-Minute Dance" (hereafter Two-Minute Score) is another of his movement scores that was likely produced at the same time as the Capitol Towers Score in 1963. Just like the Capitol Towers Score, it closely resembles the SF Score and was drawn by Dick Jongejan, likely as a special collaboration with Halprin,

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J. Robert Dumouchel, "Prime and Pertinent," *Journal of Housing and Community Development* no. 2 (1964); Robert J. Lewis, "Cities and People: An Eloquent Picture Book," *Washington Star*, December 10, 1963; and Wolf Von Eckhardt, "The search for Form... and Fun," *Progressive Architecture* 45 (September 1964): 230, 232, 236. All of the articles cited in this note are in Folder "Cities - review," call no. 014.I.A.5123, Halprin Collection.

[466] Philip Thiel, "Time and Place in the City: Cities," *Landscape* (Spring 1964): 45-46.

either inside or outside of class.[467] Although the entire LA 298 class was characterized by intense collaboration between Halprin and core students, the polished, careful presentation of both the Capitol Towers Score and the Two-Minute Score suggests careful study and a significant amount of work for Jongejan on his own. No other such scores, carefully printed and drawn by one student, have yet been found by this author.[468] Unlike the Capitol Towers Score, however, the Two-Minute Score was not published in *Cities*; it did not appear in print until 1969 (in Halprin's third book, *RSVP Cycles*). However, the shared visual vocabulary, framework, and Halprin-Jongejan authorship of the two scores makes it likely that both were completed in the same general timeframe in 1963.

The Two-Minute Score is a large drawing that attempts to apply the class's newly-developed movement notation to a dancer's movement through space. (fig. 3.28) Although dance notation functioned as an essential precedent for Halprin's system, it was distinct from the Two-Minute Score notation because dance notation scored successive positions of the body, arm, leg, head, foot, etc., rather than recording the general

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[467] The "Score for a Two-Minute Dance," housed at the Halprin Archives, is clearly signed "dick c. jongejan" at the bottom right. See Dick C. Jongejan and Lawrence Halprin, "Score for a Two-Minute Dance," Folder "LH Design Class, U. Calif. Fall 1963 – Halprin lectures," call no. 014.I.A.6041, Halprin Collection. When the score was reproduced in *RSVP Cycles* in 1969 (p. 42), the illustration credits only note "Dance notation for a two-minute event, developed by Lawrence Halprin," (p. 203) with no attribution of Jongejan's involvement. However, Jongejan's signature appears in miniscule type directly on the reproduced image of the score on page 42 in the same place as on the original, affirming that the drawing was indeed made by Jongejan despite being developed by Halprin.

[468] Such collaboration could have taken place at any point in the fall of 1962 or the spring/summer of 1963, but still likely no later than 1963 for the reasons listed above. LA 298 was intended to be taken by students in their third or final year of the landscape architecture degree. Although it is possible that Jongejan was employed by Halprin after he graduated in 1963, this author has been unable to find any data confirming the fact.

experience of movement through space.[469] Compared to dance notation, the system developed by the class tracked the movements of the surrounding environment relative to the individual, in this case, to the dancer as she or he moved across the stage: "This system does not provide for recording particular movements of the body or parts of the body, but only for the horizontal and vertical displacement of the body in relation to objects in the environment. Particular movements of the body or parts of the body could be recorded with the aid of other notating systems such as labanotation."[470]

In the Two-Minute Score, horizontal and vertical displacements were captured using the same horizontal and vertical tracks developed for the SF Score. As in the latter, the dance score tracks progressed over a standard time scale from left to right and were keyed to a "Main Track," which in this case appeared as a diagram appended to the right side of the score instead of as a separate document. The main track showed the overall movement of the dancer, in plan view, as she navigated through an environment of various types of objects. Each object was represented by a symbol given in the main track and that was also used to denote its position in relation to the dancer in the horizontal and vertical tracks.[471]

The Two-Minute Score was, like the SF Score and Capitol Towers Score, read

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[469] Even Labanotation, one of the only dance notations to score from the point of view of the dancer, described the movements of the dancer's body relative to the dancer. Supplemental floor plans, intended to accompany Labanotation, simply traced the path of the dancer across the stage.

[470] "Movement Notation System: Dance Notation," p. 3, Folder "Motation," call no. 014.I.A.5132, Halprin Collection. Three pages titled "Dance Notation" were appended to the "Movement Notation System" document described in footnotes above. Although both are unattributed and undated, both describe the process and progress of the LA 298 class and were found in files of class material.

[471] "Movement Notation System: Dance Notation," p. 1-3, Folder "Motation," call no. 014.I.A.5132, Halprin Collection; Jongejan and Halprin, "Score for a Two-Minute Dance," call no. 014.I.A.6041, Halprin Collection; and Halprin, *RSVP Cycles*, 42.

from left to right and translated by reading the horizontal track in conjunction with the vertical. Unlike the SF Score, in which the centerline represented the straight-ahead view of the individual with objects to the left and right scored at their relative positions from center, the Two-Minute Score was realigned so that the notator was positioned at right angles to the movement of the dancer. Thus, if the dancer were moving from left to right, right horizontal would always be in front of the dancer while left horizontal would be behind (the opposite would hold true if the dancer were to move in the opposite direction).[472] Objects are shown on the score for as long as they remain directly in front of or behind the dancer as points of reference. A change in direction, therefore, would yield new objects as points of reference, given by different symbols (as defined in the main track). Relative physical closeness of the dancer to surrounding elements is represented by the distance of the element from the centerline of the track. The closer the dancer moved to a given object, the closer it would be represented to the horizontal centerline of the track. As the dancer passed by the object, it would move from horizontal right (in front of the dancer) to horizontal left (behind the dancer) and would continue to be represented until the dancer changed the direction of her line of travel. Objects that the dancer passes directly over or under intersect the centerline of the horizontal track while objects that the dancer simply passes by cross from right horizontal to left horizontal without intersection.[473]

The vertical track in the Two-Minute Score captured actions such as the dancer

[472] "Movement Notation System: Dance Notation," p. 1, Folder "Motation," call no. 014.I.A.5132, Halprin Collection

[473] "Movement Notation System: Dance Notation," p. 1-3, Folder "Motation," call no. 014.I.A.5132, Halprin Collection.

moving up and down a ladder or over and under another such element that extended into vertical space and was, like the SF Score, read in conjunction with the horizontal. Unlike the SF Score, it was not split into left and right of the centerline but above and below. The centerline represented the "line of vertical reference," essentially the bottom of the foot: the point at which the dancer's body intersected the horizontal plane.[474] Thus, an object sitting on the floor and extending any vertical distance into the space above it would appear above the centerline unless and until the dancer climbed up or over it. At that point, the object would appear below the centerline and would be drawn progressively lower and lower if the dancer were to continue upwards, as in the case of a ladder. In the event that the dancer climbed back down, the object would be drawn closer and closer to the centerline until the dancer returned to the level surface upon which she began.[475] Thus, the horizontal score, vertical score, and main track must be read in concert with one another to paint a complete picture of how the dancer's environment moves in relation to herself. Additional details such as the dancer's body position, extension or flexion of joints and limbs, would necessitate an additional form of notation such as Labanotation.[476] Indeed, the need for an additional form of notation points to the inefficiency of Halprin's system and reveals it to be essentially an exercise on paper rather than any sort of integrated planning solution. Moreover, compared to the ease and simplicity Labanotation, the notation in Two-Minute Score is counter-intuitive and

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[474] "Movement Notation System: Dance Notation," p. 2, Folder "Motation," call no. 014.I.A.5132, Halprin Collection.

[475] "Movement Notation System: Dance Notation," p. 2-3, Folder "Motation," call no. 014.I.A.5132, Halprin Collection.

[476] "Movement Notation System: Dance Notation," p. 3, Folder "Motation," call no. 014.I.A.5132, Halprin Collection.

difficult to interpret, again largely due to the splitting and awkward juxtaposition of horizontal and vertical experience.

The same year that Halprin published his *Score from San Francisco to Sausalito* and *Scores for Walks Through Capitol Towers* in *Cities* in 1963, he also prepared one of his most involved fountain notation scores. The Score for the Seattle Center Fountain, prepared between 1962 and 1963, was his next fountain score after Seminary South and Oakbrook. The Center rose from the ashes of the Seattle World's Fair of 1962, dubbed the Century 21 Exposition. Halprin's fountain, initially called simply the "Seattle Center Fountain," it was one of several commissioned and built for the Center between 1962 and 1964.[477] The fountain was designed by Lawrence Halprin & Associates but its implementation was a collaboration between Halprin's office, San Francisco-based artist and professional architectural sculptor Jacques Overhoff, and mechanical engineer Daniel Yanow.[478] In structure, it consisted of 170 agricultural sprinklers set atop pipe braces that

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[477] The fountain was likely designed in 1962-63, with the majority of the work occurring in 1963. A final visit by Yanow and Overhoff to modify and adjust the timing of lighting and water effects was made in September of 1963. It was also noted at this time that there were some mechanical, electrical, and support issues that needed to be resolved, indicating that the fountain may have been open in the late fall of 1963. The Specifications for the Fountain, dated April 1963, indicate a $2000 allowance for water effects, including labor for installation and adjustment of sprinkler heads as well as modifications to the sequence controls. This indicates that the design of the fountain was already fairly far along. Paul Thiry and Lawrence Halprin & Associates, "Addendum No. One to Specifications, Fountain and Site Development Work, Seattle Center, City of Seattle, Washington, Department of Public Works, 10 April 1963," Folder "Seattle Civic Center; project files, 1962-1964," call no. 014.I.A.2426, Halprin Collection. Installation seems to have proceeded over the course of the late spring and summer, according to correspondence between Halprin, Thiry, Nicholas Quennell of Halprin's office and Ed Burke of Thiry's office. See: Letters, Nicholas Quennell to Ed Burke, 16 May 1963 and 17 May 1963; Notes, "Seattle Center, Reply to Paul Thiry letter dated 5/22/63, 23 May 1963;" and Lawrence Halprin, Notes, "Seattle Center, Conversation with Ed Burke, 9/10/63." All located in: Folder "Seattle Civic Center; project files, 1962-1964," call no. 014.I.A.2424, Halprin Collection. See also Memorandum, "Seattle Civic Center: Notes from visit to site by Mr. Daniel Yanow and Mr. Jacques Overhoff on September 13-16," 18 September 1963, Halprin Collection.

[478] The design and score for the fountain were both published in 1969 in *RSVP Cycles*, in which illustration credits note that the design of the Seattle Center Fountain was by Lawrence Halprin & Associates and that the sculptor on the project was Jacques Overhoff. The mechanical drawings, such as mechanical section

ranged in length between roughly 1 and 15 feet. The pipes were set perpendicularly into a modular pool piping grid that lay just below the surface of the lagoon, creating the visual impression that the fountain consisted of a mass of pipes sticking straight up in the air from the water's surface. Atop the pipes – both tall and small – sprinkler heads for both lawns and orchards were affixed, many of them of the pinwheel-type design that rotated easily on a central fixture.[479] (fig. 3.29)

Central to the design was the programming of the water and light effects. As in previous fountains, the sequence was controlled by a computer that determined which sprinklers received water by opening and closing various valves, again, based on a master score. However, whereas in previous cases the score was totally composed and controlled, in this case the score was intended to be open-ended, largely due to the nature of the agricultural sprinkler heads and their configuration. In *RSVP Cycles*, Halprin explained: "Some fountains have been scored with great precision and, in large measure, all the effects predetermined. Others such as the Seattle Center fountain, could not be scored completely since the essence of the design was inherent in the water heads (the

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and piping diagram shown on page 56, were all prepared by engineer Daniel Yanow. The score for the Seattle Center Fountain was drawn by Curtis Schreier, an architect who worked as a designer in Halprin's office from 1967-1970 (for more on Schreier and implications for dating the score, see below in text and footnotes). See Lawrence Halprin, *RSVP Cycles* (New York: George Braziller, 1969): 56 and 203. The extent to which Overhoff participated in design decisions is unclear, especially given the fact that the fountain design was credited solely to him in contemporary publications. See "Fountains: Avant-garde or conventional, fountains with imaginative design provide new ways for water," *Art in America* 52 no. 6 (December 1964): 45; Mary Fuller, "San Francisco Sculptors," *Art in America* 52 no. 3 (June 1964): 59; and Stanton H. Patty, "Poll for Funny Fount: 'Plumber's Nightmare' Leads," *The Seattle Times*, Wednesday, July 22, 1964, News Classified, p. 49, all located in Folder "Seattle Civic Center; project files, 1962-1964," call no. 014.I.A.2425, Halprin Collection. It is likely that Overhoff participated actively in overall design and certain that Overhoff was responsible for adjusting the lighting effects, the water jet effects, and the overall timing cycle. Memorandum, "Seattle Civic Center: Notes from visit to site by Mr. Daniel Yanow and Mr. Jacques Overhoff on September 13-16," 18 September 1963, Folder "Seattle Civic Center; project files, 1962-1964," call no. 014.I.A.2424, Halprin Collection.

479 Patty, "Poll for Funny Fount," 49, Halprin Collection, and Halprin, *RSVP Cycles*, 54-57 and 203.

performers) themselves. These were agricultural sprinklers set in a predetermined arc, horizontally as well as vertically, as pinwheels. Many of these heads shift direction when counterpressures are exerted, consequently the great delight of this fountain is that it never acts the same twice, since its water effects respond instantly to the countereffects of other water effects, wind, and atmospheric conditions. The score therefore remains open-ended depending on instant feedback."[480]

The original score for the Seattle Center Fountain existed in the form of two separate drawings that were intended to be overlaid to convey the entire scheme.[481] (fig. 3.30) Combined and published in *RSVP Cycles* in 1969,[482] the score is closest in form to the "Revised Sequence" developed for the Seminary South Fountain, albeit with several significant modifications. At the bottom of the score, lines which seem to mimic those of the musical staff stretch across the page from left to right. The spaces between the lines serve as channels in which a different water effect is described. The water effect for a given channel is specified to the left, where seven different symbols are shown. The symbols, each on a different channel or row, represent seven groups of sprinklers arrayed around the pool piping grid. To the right, the staff lines extend in increments of 10 to a total of 60, marking the measured time of the score. A solid bar in a given channel indicates that the specified group of sprinklers is on; empty space indicates that the sprinklers are off. In this way, the score is similar to the "Revised Sequence."

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480 Halprin, *RSVP Cycles*, 54.

481 Lawrence Halprin & Associates (Curtis Schreier, according to *RSVP Cycles*, p. 203), "Seattle Fountain: Red" and "Seattle Fountain: Black," Large drawings file "Tube Box 935-937 – Scores," call no. 014.II.A.254, Halprin Collection

482 Halprin, *RSVP Cycles*, 56.

However, the rest of the score is considerably different. Above the staff lines, four plan view diagrams of the pool piping grid show the intended visual effects of the fountain at four separate moments in the overall score, keyed to the lines below. The diagrams are modified in these four instances by water effects that swirl, shoot, and arc across the fountain. Underneath the visually indicated water effects, the grid itself is broken down into seven different portions. Each portion is rendered with a different line pattern made up of various combinations of dots, dashes, and squiggles. The seven different segments of the pool indicated by these markings correspond to the seven symbols shown in the staff lines below. Thus, each line pattern corresponds to a different group of sprinklers, indicated in the plan above as well as in the symbols in the score below. One group of sprinklers, for example, is represented in the pool grid above by continuous small dots, arranged in a narrow horizontally-aligned rectangle in the grid. This group of sprinklers is represented in the score on the bottom-most channel, which is indicated by small continuous dots, followed by the symbol of a narrow horizontal rectangle. Other groups of sprinklers in the pool piping grid are arranged respectively in a wide horizontal rectangle, a narrow and a wide vertical rectangle, central cross, and central square. Each of these arrangements is keyed by the corresponding dot pattern and small symbol in the remaining six channels in the score below.[483]

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[483] Halprin noted in several places that the timing and sequencing of the fountain was directed by a master score, suggesting that some kind of score was finalized during this period between 1962 and 1964. See Halprin, *RSVP Cycles*, 54, 57, and 203. However, it is unclear whether the initial score for the fountain was the same one published in *RSVP* Cycles and held in the Halprin Archives. This latter and extant score is the only record this author could find of a score on paper, but it was not drawn until at least 1967. The designer credited in *RSVP Cycles* with drawing the score, Curtis Schreier, did not begin working for Halprin's office until 1967, the year he graduated with his degree from the Rhode Island School of Design. He moved to San Francisco and worked with Halprin until 1970, in many different capacities, including as a photographer for he and his wife Ann's Experiments in Environment of 1968. See Felicity D. Scott, *Living Archive 7: Ant Farm* (Barcelona and New York: Actar, 2008): 34. It is possible that the fountain

Ultimately, all of Halprin's notations from 1962 and 1963 recorded events or effects in an environment that already existed. In his fountain notations, Halprin sought to coordinate the effects of water and lighting over time in his own brand of water choreography but did not propose a design for an environment that had not yet been constructed. In a similar way, his SF Score, Capitol Towers Score, and Two-Minute Score all recorded the movement of an individual – or group of individuals – through a space that had already been designed. These scores, although early steps in Halprin's search for a tool to record movement through space, are more notations of record rather than tools of design. It would take Halprin another year to begin experimenting with the notational possibilities of designing a proposed or imaginary environment, an attempt he did not make until embarking on his project for the Bay Area Rapid Transit District in 1964.

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was run on a similar score for a number of years before the final version was drawn by Schreier, very likely for publication in *RSVP Cycles*.

CHAPTER 4

Halprin and the Bay Area Rapid Transit District

In 1964, as an Urban Design Consultant for the Bay Area Rapid Transit District[484] (hereafter BART), Halprin put his notation to the test, constructing one of his longest and most involved movement scores. The history of BART began in 1951, when the California State Legislature authorized the formation of a BART Commission to examine regional transportation issues.[485] The commission submitted a long range regional development plan to the Legislature in 1953 and recommended a master rapid transit plan for the nine counties in the Bay Area region be undertaken to determine future direction. In 1956, the New-York based engineering firm of Parsons, Brinckerhoff, Hall and MacDonald submitted a report detailing a regional transit system consisting of a linear, fixed-rail system. The report was enthusiastically accepted and, in 1957, the Legislature passed a bill recommending the creation of a five-county rapid transit district tasked with connecting major commercial centers with smaller suburbs along the Bay.[486] By 1959, BART had partnered with a coalition of engineering firms known as Parsons,

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[484] "The Chronology," 129.

[485] The California State Legislature had voted in 1949 to enable the formation of a Bay Area Metropolitan Rapid Transit District but no action was taken directly as a result of this act. An ad-hoc San Francisco Rapid Transit Committee was formed in 1949 but it was not until the act of 1951 that any substantial action on the governmental level took place. See Richard Grefe and Richard Smart, *A History of the Key Decisions in the Development of Bay Area Rapid Transit (BART)* (McDonald & Smart, 1976).

[486] Grefe and Smart, *History of Key Decisions*, 11-33.

Brinckerhoff-Tudor-Bechtel as the consultants for the design and construction of a network of high-speed rail lines throughout the Bay Area.[487] Although two of the five original BART counties voted to rescind their involvement in the district between 1961 and 1962,[488] a BART "Composite Report" detailing a plan for the remaining three counties was nonetheless prepared by May of 1962 for 71 miles of high-speed track, 33 train stations, renovations to the San Francisco Municipal Railway, and a "transbay tube" to connect San Francisco with the communities of the East Bay.[489]

Although the BART project was in line with other major state-initiated projects across the country, such as the freeway construction projects of the early 1950s, the BART project is notable in that it was proposed and initiated without substantial federal funding. As a rapid transit initiative, BART did not qualify for substantial federal funding at the time it was proposed. Indeed, federal funding for mass transit never reached the level pledged to highway construction.[490] The context of San Francisco's highway controversies, however, provides a glimpse into the anti-highway sentiment of the city, which may have smoothed the passage for a mass transit initiative such as

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[487] The coalition combined the original firm on the project, Parsons, Brinckerhoff, Hall and MacDonald, with two San Francisco-based firms: Tudor Engineering and Bechtel Corporation. Grefe and Smart, *History of Key Decisions*, 43.

[488] The original BART legislation of 1957 connected five counties: San Francisco, Contra Costa, Alameda, San Mateo and Marin Counties. However, the latter two voted to remove themselves from the district, citing high construction costs, high taxes, and pre-existing transportation routes (San Mateo in December 1961 and Marin in May 1962). Grefe and Smart, *History of Key Decisions*, 36-40.

[489] Grefe and Smart, *History of Key Decisions*, 43-44, 56-60, 110-113, and 178. See also: Paul Bay and Joel Markowitz, *The Bay Area Rapid Transit System: Current Status and Impacts* (San Francisco: Metropolitan Transportation Commission of the San Francisco Bay Area, 1975), 4.

[490] The Housing Act of 1961 took initial steps by making grants available for pilot studies to improve public mass transportation and offering loans for the improvement of existing transportation facilities and equipment, but even the funding provided by the Urban Mass Transportation Act of 1964 paled in comparison the money devoted to highway construction. Scott, 568-569.

BART.[491] It has been suggested that the contentious highway debates of San Francisco in the 1950s and 60s (see Chapter 2), worked to the advantage of the proponents of the BART project. The apparent and impending success of the anti-highway lobby convinced the Mayor and the Bay Area Council, which included key Bay Area industrialists, to support the BART campaign.[492] In the end, the $792 million bond issue was passed by a narrow margin, requiring 60% of the vote to pass and receiving 61.2%, and that too only because last-minute changes in state law had reduced requirements from a two-thirds to a three-fifths majority.[493]

Following the bond election of 1962, engineering work on the ambitious BART project began in 1963 and construction officially commenced a year later, in June 1964.[494] Halprin's firm joined the project in early 1964 with the task of developing guidelines for landscape design along BART's proposed routes. By July of that year, Halprin had not only written a report detailing criteria for landscape design, but he had also prepared a movement notation score that detailed his design for a journey through a small section of the proposed route from Orinda to Concord, titled "BARTD Movement Notation Orinda to Concord" (hereafter BART Score) and dated to July 1964.[495] (fig. 4.1)

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[491] See Johnson, "Captain Blake," 66.

[492] Johnson, "Captain Blake," 66.

[493] Chester Hartman with Sarah Carnochan, *City for Sale: The Transformation of San Francisco* (Berkeley: University of California Press, 2002), 7; Grefe and Smart, *History of Key Decisions*, 43-44 and 56-60.

[494] The groundreaking for Mount Diablo Test Track, built to test various train designs and automatic control systems, was on June 19, 1964 and marked the official beginning of all BART construction. The test track was completed 10 months later. Bay Area Rapid Transit Public Information Office, *A History of BART (1946-1972)* (Oakland, CA: San Francisco Bay Area Rapid Transit District, 1988), 3.

[495] Lawrence Halprin & Associates, *First Report to the Bay Area Rapid Transit District on Development of Landscape Design Criteria*, July 1964, Folder "Landscape Design Criteria- BART," call no. 014.I.B.2505, Halprin Collection and *BARTD Movement Notation, Orinda to Concord, July 29, 1964*, Rolled tube, no call number, Halprin Collection (hereafter *BART Score*).

In both the report and the score, Halprin examined the route between Orinda and Concord on the Contra Costa line, a roughly 11-mile journey stretching eastward from the Bay.[496] Because the report and the score are both dated to July 1964, it appears that they were developed in tandem, despite the fact that the score was never published. As such, as opposed to his previous scores, the BART Score was not an after-the-fact record of completed design, but a practical design-based tool used to project future design.[497] When examined together, the two documents present compelling insights into Halprin's intentions and goals regarding the incorporation of his new movement notation system into the larger practice of landscape architecture.

Instead of simply engaging in a natural resource analysis in his report, or suggesting a minimally invasive or least expensive route, Halprin examined how the placement and treatment of the high-speed rail line and the visual characteristics of the surrounding landscape could not only enhance commuters' experience of the journey, but also function as a cohesive regional force that would draw the entire area together.[498] In his report, he wrote:

> The Rapid Transit system has the potential of beginning to solve many of the searing and difficult urban problems of our times…. Whether Rapid Transit wants

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[496] *First Report*, Section IV, 2. The Contra Costa line, as mentioned earlier, branched northeast from the transbay tube and the city of Oakland into Contra Costa County. This section of track is notable because its easternmost portion, a 4 ½-mile stretch between Walnut Creek and Concord, comprised the Mount Diablo Test Track. The report and score included the stretch along the Mount Diablo Test Track as well as another roughly 6 ½-mile stretch farther westward, between Orinda and Walnut Creek. *First Report* and *BART Score*.

[497] *BART Score*, Halprin Collection.

[498] The First Report also included a section on cost estimates. Prepared in collaboration with the California State Highway Landscaping Department, the estimates were presented in a tri-partite scheme that reflected minimum, maximum, and recommended costs for landscaping. The cost was estimated based on the right of way available: higher costs in urban or suburban housing areas where considerable right of way existed versus industrial areas where little or no land was available for landscaping. See *First Report*, Section II 1-7 and Fig. II.i.

to or not, it will become a vast regional force – shaping the Bay Area into new configurations. It seems to us a great opportunity, then, to shape it well rather than poorly; to visualize what its effects will be; and to try through the system to extend its influence into the regional landscape. With guidance and direction all the communities in the Bay Area can mesh and enlarge their plans in collaboration with the transit system. We have the great opportunity of taking the initiative.[499]

In laying out his general design policy, Halprin asserted that BART, as a regional force, could nonetheless respond to local conditions. The district was already separated into five different lines: San Francisco, Oakland, Contra Costa, Berkeley-Richmond, and Alameda.[500] In order to better respond to contextual, local conditions, Halprin further divided the routes into various zones based on the type and character of the surrounding terrain. Each zone maintained the same character and response to its particular surroundings while simultaneously staying within the more general guidelines established for the line as a whole. Landscaping within these zones, for Halprin, was not merely about planting the right of way; it demanded a consideration of all "elements which form part of the visual scene, such as slopes, rails, abutments, fencing, grading, draining ditches, integration or modification of land forms, as well as problems of urban design, use of land under or adjacent to the track, design of structures and problems of route alignment."[501] Location of the right of way was therefore based on the spatial enclosure of the existing terrain, necessary integration or separation from landscape features, response to flat versus hilly topography, preservation of existing plantings and the

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[499] *First Report*, Introduction, n.p.

[500] At the time the report was written, the first two lines were mostly subway but the last three were predominantly above ground and consisted of aerial structures. The San Francisco line was above ground in the Mission District and then went underground and through the transbay tube. From the tube, the line went through the city of Oakland then branched northeast on the Contra Costa line, northwest on the Berkeley-Richmond line, and southeast on the Alameda line. See *First Report*, Fig. I.

[501] *First Report*, Section I, 1.

addition of new. Particular consideration was given to potential uses of the land abutting the track (landscaped parks, playgrounds, etc.) or, in some cases, under the track (parking, commercial structures, etc.).[502]

The purpose of considering such a total visual environment was two-fold: to improve the view of the rail line from the surrounding communities and enhance the rider's view of the communities as experienced from the rail line. Halprin's consideration of the perspective from the moving train was a central aspect of his general design policy: in order to design a landscape that was to be perceived from a high-speed rail car, it was imperative to understand how motion affected visual perception. At higher speeds, Halprin explained, detail was harder to perceive but perception of broader patterns of mass, space, and rhythm became easier. As such, elements placed too close to the track would be lost in a blur while elements too far away would be perceived as static. The goal was to find the ideal middle ground where elements would be close enough to perceive as part of a larger rhythm or pattern but not so far away that they were lost in the landscape.[503] As Halprin wrote, "variety in the visual experience along the route serves to locate the traveler – particularly the commuter – as well as guarding against monotony. Each locality passed through should provide its recognition points, both within and outside the right of way, and transitions from one area to the next should be carefully

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[502] *First Report*, Section I, 2-7. Halprin focused on five key details of landscape design: planting, slope design, fire hazard, maintenance and irrigation, and fencing. He forecast the challenges inherent in the design of each feature and suggested several alternatives in each case that were sensitive to the various conditions faced across the length of the five lines and fourteen zones. *First Report*, Section III, 1-4 and Fig. III.i.

[503] *First Report*, Section I, 1-2.

controlled, though they need not be undramatic."[504]

In his Landscape Visual Analysis Halprin diagrammed the visual characteristics of the landscape between Orinda and Concord and annotated those portions of the line visible from the exterior environment. (fig. 4.2) On a map that detailed locations and spatial characteristics of all "visually dominant" landforms and vegetation surrounding the proposed track, Halprin added sweeping lines indicating the view corridors between the track and the surrounding environment, and vice versa. As Halprin explained, "The amplitude of the line indicates the range of the view, whereas the frequency between waves on the line shows the rhythmic character between views."[505] Based on his Visual Analysis, Halprin recommended features ranging from heavy tree plantings and semi-permeable tree screens to replacement of natural grass cover and molding cuts along natural landform lines.[506] At a portion of the route between Walnut Creek and Concord designed A1,[507] for example, the track approached Walnut Creek station on a wide curve with sweeping views to the right. In his Visual Analysis, Halprin wrote, "Detailed study of this curve is needed to exploit opportunities for vistas from passenger cars of Walnut Creek and Mt. Diablo. Treatment of this area should include close liaison with the

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504 *First Report*, Section I, 2.

505 *First Report*, Section IV, 3. See also *First Report*, 2-3 and Fig. IV.iii (Landscape Visual Analysis: Central Contra Costa Line).

506 *First Report*, Section IV, 3.

507 The route between Orinda and Concord was divided into five sections for analysis: two between Orinda and Walnut Creek (B1 and B2), and three between Walnut Creek and Concord (A1 through A3). All five portions are described in an appended document labeled "Sector Characteristics" that explains in text what the General Landscape Plan depicts in imagery. Two of these sectors, A2 and A3, received particularly close analysis and are the subject of two additional drawings included with the *First Report* labeled "Detail Proposals". These proposals depict two alternatives for each sector: design "based on present engineering criteria" above and "possible design assuming regional participation" below. The regionalized plans are significantly more elaborate with urban and natural amenties extending beyond the proposed right of way and engaging in a more synergistic approach.

California Division of Highways and local authorities."[508] At A2, a little further along the journey where the track traversed a wide and expansive lake, Halprin recommended carefully locating dense plantings that would increase the sense of compression and release and function to create a more memorable visual and spatial experience; (fig. 4.3) open plantings or "permeable screens" were reserved for residential areas to create a sense of continual privacy without entirely closing the track off from the surrounding environment. Similarly, at B2, a portion of the track between Orinda and Walnut Creek that bordered an aqueduct, reservoir, and regional park, Halprin recommended replacing the fractured view corridors with a wide sweeping view and suggested that the area be looped together through biking and hiking trails.[509]

In the General Landscape Plan that followed the Visual Analysis, Halprin presented the route from Orinda to Concord as it would be experienced following the incorporation of his recommendations, indicating proposed parks, tree plantings and screens, pedestrian crossings, urban amenities, and view corridors along the right of way.[510] (fig. 4.4) Halprin not only located existing amenities, but made recommendations for proposed additions, which were placed according to local as well as regional needs.[511]

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[508] *First Report*, Section IV, "Sector Characteristics," n.p.,

[509] *First Report*, Figs IV.iv and IV.iii, as well as "Sector Characteristics," n.p.

[510] The General Plan was also informed by Halprin's Land Use Study, which classified the areas surrounding the right of way into categories such as commercial, industrial, regional parks, and residential use (multiple family, medium density, and low density). The Land Use study combined into a single document the projected land use studies and general plans of several area and regional planning commissions, including The Contra Costa County Planning Commission, the Concord and Walnut Creek City Planning Departments, and the East Bay Regional Parks District. *First Report*, Section IV, 3.

[511] *First Report*, Section IV, 4. See also *First Report*, 3-4 and Fig. IV.i (Projected Land Use Along Central Contra Costa Line). Halprin's argument for this regionalized approach is further detailed in his textual analysis of his General Landscape Plan, which divided his recommendations into three main categories: earthwork, trees, and land use proposals. Under earthwork, Halprin recommended that BART subscribe to the practice of the National Park Service and mold earthwork cuts to the existing landscape contours,

Ultimately, Halprin hoped that the development of the rail line could be partnered with that of other regional and recreational amenities such as bicycle and hiking trails, pedestrian parks, and a unified and efficient total transportation system. Such an approach would yield a positive consumer relationship as it was based on the concept that "for something taken from the community, give something back of equivalent value."[512] Halprin further urged the BART commission to think beyond the current engineering criteria that was driving the design. Instead of trying to incorporate amenities into the narrowly construed, existing right of way, Halprin argued that the right of way be expanded into surrounding areas, knitting the rail line into the surrounding area through mutually beneficial recreational and regional ventures such as parks and playgrounds.[513]

The BART Score seems to have emerged in tandem with the report. Never published, the score consists of three horizontal strips: photographs above and two tracks below. (figs. 4.5-4.6) The photographs are presented in a serial/panoramic fashion and progress along the time scale of the score. The two tracks in the BART Score, however, both represent horizontal experience (rather than horizontal and vertical). Both progress temporally at a starting speed of 35 mph, although mileage markers are also indicated above the score at the appropriate points in time. Although the two tracks are close to identical, the bottom contains additional landscaping features – most notably, landforms, vegetation, and large trees – not visible on the top. The top track, therefore, seems to have notated the experience of the traveler along the proposed route according to the

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thereby improving appearance and facilitating smooth transitions between extended and confined views as well as reducing large-scale road maintenance in the case of rock slides.

[512] *First Report*, Section IV, 2.

[513] *First Report*, Section IV, 4-7 and Fig IV.v (Detail Proposals).

most basic conditions – either those that existed or were provided for in the narrow engineering criteria – while the bottom recorded the hypothetical journey based on Halprin's complete landscape recommendations. As such, the top track corresponds most closely to the Landscape Visual Analysis of the route whereas the bottom corresponds to the proposed recommendations noted in the Landscape General Plan.

For example, close to mile marker 11 on the BART Score, the top and bottom track convey two different experiences, the top track reflecting the characteristics noted in the Landscape Visual Analysis and the bottom track depicting the changes Halprin recommended in the General Landscape Plan. The top track reveals a centerline immediately surrounded only by utility poles on the left and some sparse tree cover on the right, reflecting the existing conditions indicated in the Visual Analysis. (fig. 4.7) The bottom track, however, shows a continuous row of small triangles surrounded by circles to either side of the centerline, symbols described in the legend as "large trees." (fig. 4.8) These trees correspond to the dual screens of trees shown flanking the track in the General Landscape Plan (see fig. 4.4). Similarly, slightly further along the journey, at the point where the train would have risen on a structure before pulling into Concord Station, the existing conditions on the Visual Analysis show few defining features (see fig. 4.2). Correspondingly, the top track indicates the change in support by cross-hatching but shows only utility poles to the left and some small trees to the right. (fig. 4.9) In the General Landscape Plan, Halprin proposed to introduce a large stand of trees to the right of this portion of the rail line (see fig. 4.4). The bottom track, which also shows the change in support with cross-hatching, correspondingly illustrates these trees with a cluster of triangles within circles.[514] (fig. 4.10) Indeed, in the section of his report detailing this portion of the rail line, Halprin recommended the development of "an elongated wayside park and recreation area related to the Rapid Transit line."[515] Neither the large stand of trees to the right, the screened tree corridor, nor the wayside park are indicated in the Visual Analysis or the top track, but all three are shown in the General Landscape Plan and the bottom track, establishing a correspondence between the report and the notation and thereby tying his notation into his larger process of design.[516] It is interesting to note that Halprin's incorporation of the BART Score analysis into his other diagrams, analyses, studies, proposals, and plans included in his report indicates that he intended his notation to function in tandem with the existing tools of landscape analysis. Although it is unclear whether Halprin shared his BART Score with his clients in the BART district, its elaborate and painstaking preparation is evidence of its role in Halprin's initial report to BART in 1964.

It must be noted that Halprin's score for BART, although an interesting exercise in comparing existing landscape conditions with proposed landscape recommendations, is rather simplistic and reductionist. As in his "Score from San Francisco to Sausalito" (see Chapter 3), Halprin used the same symbol to represent a wide range of elements. All basic landforms were symbolized by a circle and all vegetation by a triangle, distilling the visual experience down to exceptionally general terms. Although this provided him with

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[514] See *BART Score* and *First Report*, Figs. IV iv (General Landscape Plan) and IV iii (Landscape Visual Analysis).

[515] These proposed parks are also shown in the Projected Land Use study in the report. *First Report*, Section IV, n.p., Sector Characteristics.

[516] See *First Report*, Fig. IV iv (General Landscape Plan) and Fig. IV iii (Landscape Visual Analysis), respectively.

a quick way of recording what he saw, it did little to convey the actual experience of moving through a particular space. Moreover, it seems that the upper track, which was intended to record the experience of traveling through the existing environment, was as much a work of fiction as the bottom track, which imagined the fully landscaped journey. This is due to the fact that the groundbreaking for the first portion of BART's rails, a test track stretching 4 ½ miles between Walnut Creek and Concord, did not take place until June of 1964 – only a month before the date on Halprin's BART score – and was not completed until the following year.[517] In addition, the initial 6 ½ miles notated on the score, between Orinda and Walnut Creek, was not even included in the proposed test track. Thus, Halprin would have been unable to notate the journey from the vantage point of the constructed track. Although it is possible that he simply traveled along the route marked by the track, it would nonetheless have been difficult for him to replicate the speed of rapid transit, as the track did not follow the route of an established roadway. If this is indeed the case – which is difficult to determine conclusively as no notes exist detailing Halprin's process – it is hard to accept Halprin's notation as an objective design tool: even when it was used to record existing information, it was more subjective than objective.

In the September-December 1964 issue of *Rapid Transit: An information digest from the Bay Area Rapid Transit District*, Halprin wrote persuasively about his landscape design for the 31 miles of aerial structures of BART's 70 plus mile system, urging readers not to lobby for an underground system but for "sweeping panoramic view[s] of

[517] *History of BART (1946-1972)*, 3.

the Bay Area."[518] As he had written in his BART Report of 1964, sensitively designed elevated structures would cause minimal disruption to the landscape while also providing opportunities for regional recreation alongside, under, and next to the right of way. Because the aerial structures would be less intrusive and monolithic than freeways, they could be folded into the landscape by developing the surrounding land through the construction of parks, playgrounds, and paths of all kinds.[519] The following summer, in June 1965, Halprin submitted a more formal and finalized report titled *Landscape Design Criteria and Standard Landscape Elements*, prepared by his office, in which he detailed the general criteria for route design.[520]

Despite Halprin's progress and commitment to the project, he resigned a year and a half later, in November of 1966, when the project's engineering staff refused to incorporate his criteria for the sensitive design and placement of aerial structures. Already faced with delays and cost increases, the engineers discounted the recommendations of a landscape architect and consultant, forcing Halprin to withdraw from the project, only days after Don Emmons, BART's Consulting Architect, resigned

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[518] "On the Way: A New Kind of Transportation System," *Rapid Transit* 7 no. 2 (September-December 1964): 7.

[519] "On the Way," 7.

[520] The document listed many of the same objectives as the *First Report* but was more of a formal proposal and less of a persuasive argument, with none of the diagrams, maps, or detailed proposals of the former. General criteria for route design and station design were included such as degrees of grading, heights of railings, and preferred planting. The document specified the scope of the landscape architect's work and included drawings of standard and recommended landscape elements, from planters and bike racks to benches and bollards. Halprin's firm was listed as a consultant "under the direction of Parsons Brinckerhoff Tudor Bechtel." Lawrence Halprin & Associates, *Landscape Design Criteria and Standard Landscape Elements* (*Work Order Z-850)*, June 1965, 1-26, 42-43 and Figs. IX.1-.11 and X.1-.6, Folder "Landscape Design Criteria- BART," call no. 014.I.B.2504, Halprin Collection.

over similar design responsibility issues.[521] Emmons pointed in particular to the engineers' refusal to accept design advice regarding the aerial structures. As he explained, the project was "almost entirely guided by limited engineering considerations. Engineers are making decisions that should be made by people with knowledge and interest in urban design…. The truth is simply that there is not now a proper balance between engineering functions and planning. We have done our utmost to foster this balance, but to no avail."[522] Despite the unfortunate conclusion to Halprin's involvement in BART, his design for linear parks along the right of way, although never published, were later praised as "extremely enlightened landscaping," and "as indicative of BART's unfulfilled potential as they were accomplishments" in a history of the BART project from the mid-1970s.[523]

In 1964, as Halprin was preparing his BART score, he was also finalizing his proposals to improve the network of highways across San Francisco as a consultant for the California Department of Highways (see Chapter 2). In a workshop class at Berkeley that Halprin taught in 1964, he asked students to develop a connection between the Embarcadero Freeway and the Golden Gate Bridge, involving them in the hotly contested debates between city and state. However, it does not appear that any movement notation scores were produced in the class, or as a part of Halprin's work with the Department of

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[521] The initial bond issue of $792 million did not include a single line item for architectural or landscape architectural design, despite good intentions to the contrary. This has been attributed to BART's unwillingness to push the initial bond issue above $800 million as they feared the public would be less likely to accept it. As a result, "nonessential amenities" (such as landscape and architectural design, in the view of BART's board of directors) were eliminated. Grefe and Smart, *History of Key Decisions*, 191.

[522] "Newslines: Emmons Resigns as BART's Consulting Architect; Charges Absence of Architectural Considerations," A*IA Journal* 46 no. 5 (November 1966): 12.

[523] Grefe and Smart, *History of Key Decisions*, 192.

Highways.[524] Unfortunately, by the time that Halprin's studies on California highways were completed the following year in 1965, the relationship between the City's Board of Supervisors and the State's Department of Highways had deteriorated to the point that a mutually approved solution was all but impossible and Halprin's criteria were left unimplemented. Over the years, the increasing insolubility of the highway conflict between the city and the state thus effectively stymied the state's realization of its highway plans for the city.[525]

Indeed, Halprin's professional practice took him into many of the hotly contested realms of the 1960s, from the role of rapid transit in a society that was increasingly automobile-centric to urban freeway construction and even urban renewal.[526] It is interesting to note that the BART project soon became embroiled in many of the same controversies generated by highway construction, from popular backlash against the visual and physical obtrusiveness of elevated structures to the financial, political, and

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[524] Like the California highways consultancy, no notational score seems to have developed out of the studio class he taught at Berkeley. See assignment sheet for class: R. Burton Litton, Tito Patri, and Lawrence Halprin, "Freeways in the Urban Environment, Spring 1964 (10 February 1964)," Folder "LH Design Class, U. Calif. Fall 1963 – Halprin lectures," call no. 014.I.A.6041, Halprin Collection.

[525] For an analysis of the proposals and counterproposals generated by both the state and city on the issue of San Francisco Highways, see Johnson, "Captain Blake," 63-74. In 1966, proposals by both the city and state failed to generate consensus. See *Freeway Studies: Panhandle Parkway and Golden Gate Freeway: A supplement to technical reports* (Division of Highways, State of California Department of Public Works, 1966); and City of San Francisco, *A Report to the San Francisco Board of Supervisors on the Panhandle and Golden Gate Parkways: A Joint City-State Study* (San Francisco, 1966).

[526] Halprin consulted on many urban renewal projects in San Francisco, including the downtown Yerba Buena Center project of the 1950s and 60s. These projects have not received intense focus here because they did not seem to generate any notational scores. For more information on Halprin's urban renewal projects in the city, and on San Francisco urban renewal in general, see: Chester Hartman, *Yerba Buena: Land Grab and Community Resistance in San Francisco* (San Francisco: Glide Publications and the National Housing and Economic Development Law Project, 1974); Stephen J. McGovern, *The Politics of Downtown Development: Dynamic Political Cultures in San Francisco and Washington, D.C.* (Lexington, KY: University Press of Kentucky, 1998); Mel Scott, *The San Francisco Bay Area: A Metropolis in Perspective* (Berkeley: University of California Press, 1985); and *Community Renewal Programming: A San Francisco Case Study*, ed. Arthur D. Little, Inc. (New York: Frederick A. Praeger, 1966)

legal obstacles surrounding the taking of rights of way. The relationships between downtown revitalization, suburban sprawl, freeways, and mass transit during the 1950s and 60s were both intricate and hotly contested. Despite BART's success – if not the success of Halprin's BART score – in the face of highway failures, its history is nonetheless rife with many of the same controversies, questions, and obstacles that beset many of the urban renewal and highway construction projects of the decade.[527]

***The View from the Road,* Highway Navigation & An Evaluation System for Highway Design**

As Halprin was developing his BART score and preparing his reports on criteria for the design of urban highways for the California Department of Highways, Lynch, Appleyard, and Myer saw their monograph on highway design, *The View from the Road*, finally appear in print. The book's generous 10 x 15" pages wove columns of text together with frequent illustrations and consisted of 64 pages divided into five chapters. The first chapter presented what the authors determined to be the most defining visual elements of the highway experience while the second presented their notation system and

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[527] Hartman and Carnochan, *City for Sale*, 7; Stephen Zwerling, *Mass Transit and the Politics of Technology: A Study of BART and the San Francisco Bay Area* (New York: Praeger Publishers, 1974), 28-31. Although the stated purpose of BART was to create a traffic-free and convenient way for workers from the suburbs to commute into the city, later studies have suggested that the downtown interests that supported BART were pursuing a hidden agenda of directing urban and metropolitan development along economically beneficial and racially motivated lines. Hartman and Carnochan, 7; Zwerling, *Mass Transit*, 28-31. Rather than reducing sprawl and decentralization, it has been suggested that BART encouraged suburbanization by enabling long-distance commuting. Bay and Markowitz, *Bay Area Rapid Transit System*, 2; Grefe and Smart, *History of Key Decisions*, 7-10. It has been further noted that the initial BART system had only four stops in downtown San Francisco, making it an inconvenient mode of intra-city travel that moreover bypassed the majority of the city's lower-income neighborhoods. Similarly, while the high-income and largely white suburbs were scheduled for stations, the city's large minority neighborhood had none. Hartman and Carnochan, *City for Sale*, 7; Zwerling, *Mass Transit*, 28-31.

the third described their primary research on the Northeast Expressway. In the fourth chapter, the authors demonstrated how their notation could be used in a presentation of an alternate design for Boston's proposed Inner Belt highway and the last provided a summary of their work and indicated directions for future study. The illustrations that accompanied each chapter included photographs, diagrams, and sketches rendered in shades of black, white, and ochre, the color palette that comprised the book's design.

The authors opened the first chapter by clarifying their position on the role of the highway in urban design: "Road-watching it a delight, and the highway is – or at least might be – a work of art. The view from the road can be a dramatic play of space and motion, of light and texture, all on a new scale. These long sequences could make our vast metropolitan areas comprehensible: the driver would see how the city is organized, what it symbolizes, how people use it, how it relates to him. To our way of thinking, the highway is the great neglected opportunity in city design."[528] The authors wished to continue the tradition of the scenic roadway and harkened back to the parkways of the early twentieth century. From the beginning, however, they wrote that they intended to purposely ignore the view of the highway from the outside and chose instead to focus on the visual and motion experience of the driver and his passengers, an admission that immediately circumscribed their work and restricted it to the narrow field of highway aesthetics.[529] While the authors acknowledged the fact that visual requirements were only one of the many considerations involved in highway design, they hoped that the conclusions of their study would eventually be incorporated into the larger field of urban

[528] Appleyard, Lynch and Myer, *View from the Road*, 3.

[529] Appleyard, Lynch and Myer, *View from the Road*, 3.

design,[530] a rather naïve view in retrospect, considering the enormous range of other economic, topographic, and political factors involved in locating and designing an urban highway.

The authors asserted that the visual features of the highway and its immediate surrounding landscape, when designed well, would help rather than hinder the process of orientation to the city at large. The rhythm of elements passing alongside the driver, such as streetlights and telephone poles, gave him essential information about his perceived speed of travel.[531] A highway lacking in regular or significant roadside detail could suspend the sense of forward progression to the point where the driver felt himself to be floating. Spurred by a seeming inability to reach goals and achieve visual progression through space, drivers would tend to increase their speed of travel, a common condition on the modern highway. As a solution, the designer could place regularly spaced details along the roadside to anchor the driver and prevent him from feeling as if he were floating, as well as provide him with a sense of his own speed and forward progression.[532] Both the frequency and proximity of these details were noted as effective in reinforcing the driver's sense of speed and could be used to provide him with accurate visual information his sense of forward progression.[533] This sense of forward

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[530] Appleyard, Lynch and Myer, *View from the Road*, 2.

[531] Appleyard, Lynch and Myer, *View from the Road*, 8.

[532] Appleyard, Lynch and Myer, *View from the Road*, 6, 12.

[533] This use of roadside detail, however, had to be used judiciously. As the authors explained, "the sense of varied motion is inherently enjoyable if continuous and not too violent" (Appleyard, Lynch and Myer, *View from the Road*, 8). The impact of roadside detail on the sense of motion through space was so strong, according to the authors, that the act of traveling along a 30 mph road abutted by many near and regularly spaced objects could produce a much greater sense of apparent velocity than speeding along a 60mph road in a wide, flat, and featureless landscape" (Appleyard, Lynch and Myer, *View from the Road*, 8).

progression, which the authors called “self-motion,” was linked to its equal and opposite sense, which the authors described as the apparent motion of the surrounding environment.[534] This sense of apparent motion was strengthened by the visual form of the road through the landscape in front of the driver: “The road ahead is interpreted as a sequence to follow, and is thus itself seen as moving through the landscape. It may launch itself toward a landmark, or may feint, jog, swerve, or slide past it. All of these impressions are dramatic material to the designer’s hand.”[535] (fig. 4.11) For example, if the highway curved dramatically in one direction, the visual field would immediately increase in drama and visual effect, giving an accelerated sense of forward motion through a sense of expansion along the outward side of the curve and the seeming rotation of near objects in relation to far.[536]

In order to create particularly strong effects, the designer could place major visual elements in locations of increased visual attention. Based on their studies, the authors concluded that the majority of all objects sighted by the driver were straight ahead and only a third of objects sighted were to the right or left (and even those were situated obliquely to either side of the highway rather than perpendicular to it). Most often, the driver’s attention was focused directly on the road itself and the environment immediately abutting it. However, at points along a journey where significant moments

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[534] Appleyard, Lynch and Myer, *View from the Road*, 11. Cues for self motion through space included, for example, “the seeming outward radiation of detail and textures from the point dead ahead” and an awareness of “the illusion of growth as objects approach” (Appleyard, Lynch and Myer, *View from the Road*, 8).

[535] Appleyard, Lynch and Myer, *View from the Road*, 11.

[536] This visual effect, while exciting, could also be unsettling for the driver and lead to a tendency to reduce the forward speed of travel, a consequence that the designer could either plan for or guard against, depending on the result desired. Appleyard, Lynch and Myer, *View from the Road*, 11.

of spatial compression and release were achieved, such as when one emerged from a tunnel or crested a large hill, the driver's visual attention was particularly focused. (fig. 4.12) The designer could use this awareness to program an intended rhythm into the journey along the highway. The frequency of this rhythm could be analyzed in order to fall within optimal range that was neither too fast, causing anxiety and a desire to slow down, nor too slow, resulting in boredom and an attendant desire to speed. The interval between major elements and strong experiences could therefore be intentionally modified to fall within a certain range, allowing the driver to learn to expect when major interchanges would be approaching and therefore also where potential points of decision and physical importance were located. It is puzzling that the authors failed to account here for the widely different set of concerns of the driver versus the passenger, despite dedicating their study to the experiences of all car-borne individuals. The driver by necessity was forced to watch the road and respond to immediate visual cues while the passenger was free to let his mind and vision wander, noting features that the driver did not have the luxury to attend to while also ignoring key features such as traffic signs and entrance/exit ramps.

In chapter 2, the authors argued that none of the tools available to the architect or highway engineer allowed for the programming or analysis of visually experienced sequence. Although maps provided essential information on topography, open space, and natural features, they nonetheless suffered from abstracted perspective. Serial photographs could capture sequence in a completed design, but time-intensive perspective sketches were necessary for designs still in planning stages. However, even closely spaced successive sketches and photographs represented discrete moments in time rather than a dynamic sequence.[537] A scale model could improve upon these deficiencies, they explained, particularly if the model were flexible enough to allow experimentation with alternative road placement and analysis of how its location would impact the surrounding environment. The model would create a sense of three-dimensionality but it would still present the experience as an overall pattern rather than as a sequence of visual effects. Movies, on the other hand, could convey a sequence of motion and space but provided only a fixed-eye view of the sequence, as opposed to the human perspective, in which the head could turn freely from side to side. The use of multiple cameras or the projection of film on to a curved or wide-angle screen could improve these deficiencies, but all of these techniques would be inordinately more expensive and time consuming.[538] Despite the authors' discounting of cinematic techniques in this section, their book is generously appointed with storyboard-type strips of serial photographs, which were used to convey sequence through the landscape. The authors clearly thus capitalized on the power of storyboard photography to represent spatial sequence and were paradoxically too quick to dismiss filmic techniques for the representation of visual sequence; however, their assertion that these techniques were unhelpful for unrealized designs was indeed valid.

As an alternative to these methods, the authors proposed a system of written notation: "If we want to change the view from the road, the first essential is to develop a technique of recording, analyzing, and communicating its visual sequences. Without such as technique, we are unable to express or refine design alternatives, short of building

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[537] Appleyard, Lynch and Myer, *View from the Road*, 19.

[538] Appleyard, Lynch and Myer, *View from the Road,* 20-21.

and rebuilding full-scale roads. This would be analogous to music without a notation, or architecture without drawings. Both are possible (and have occurred), but the growth of the art is thereby restricted."[539] Their notation did not represent sequence directly, as in film, but rather symbolically.[540] The notation was based upon two diagrams – a Space Motion Diagram and an Orientation Diagram – in which symbols were drawn along a continuous line that read from the bottom of the page upward rather than from the left of the page to the right as in traditional music notation. (figs. 4.13-4.14) Both diagrams were metered over a standard time increment of elapsed minutes, with the journey beginning at the bottom of the page and progressing temporally to the top. The path taken by the individual was justified as a straight line in the center of the page, based on the assertion that vision was experienced straight ahead and the environment could be understood to move around the observer.

The Space Motion Diagram was intended to capture the experiences of motion and space as felt by the observer as he traversed the selected path through the environment. The diagram was characterized by two parallel columns, with the experience of motion conveyed by a band in the center and the experience of space depicted through four coordinated symbol systems to the right. The motion band was superimposed upon the centerline of the notation's framework and was structured to convey the two related senses of self motion through the environment and apparent motion of the visual field. (figs. 4.15-4.16) Self motion, defined in terms of speed, direction, and their transitions or changes, such as acceleration, deceleration, stopping,

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[539] Appleyard, Lynch and Myer, *View from the Road*, 19.

[540] Appleyard, Lynch and Myer, *View from the Road*, 21.

starting, turning, and rising, was indicated by adjustments to the motion band. The widening of the band indicated ascent while narrowing indicated descent; similarly, the curving of the band to either side conveyed the sensation of turning.[541] Apparent speed was represented through the use of spaced horizontal lines: the faster the apparent speed, the denser the lines. Motion of the general visual field surrounding the observer was given by small arrow symbols overlaid directly on top of the motion band. The arrowhead pointed in the direction of motion of the visual field, such as alongside, overhead, or shifting diagonally and could also be modified to indicate rotation, growth and shrinkage. When used on its own, an arrow showed that the visual field itself was swinging a certain direction or otherwise changing in relation to the observer; when appended to a dot, the arrow signified that a particular object at that location was similarly shifting in relation to the observer.[542] (fig. 4.17)

The experience of space, conveyed in tandem with the experience of motion in the Space Motion Diagram, was conveyed on the right through the use of four coordinated symbol systems. The primary system, to the immediate right of the motion band, consisted of a series of discrete cross-sectional diagrams that indicated the position and degree of spatially enclosing elements, as well as the position of the observer within the relative proportions of the enclosing space. (fig. 4.18) Opaque surfaces were indicated by solid lines while screens or other objects that defined the space without completely enclosing it were shown by dotted lines. The proportions of the space were indicated by the lengths of the lines in the section while the position of the observer within the space

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[541] Appleyard, Lynch and Myer, *View from the Road*, 22.

[542] Appleyard, Lynch and Myer, *View from the Road*, 21-22.

was conveyed through the use of a dot; its size relative to the surfaces and screens conveyed the sensation of the observer's size within the enclosure. A large dot within a small section, for example, represented a tightly enclosed space in which the observer felt large, while a small dot within a large section symbolized the experience of feeling very small within a large space.[543] The second symbol system, just to the right of the sectional diagrams, conveyed the degree of the spatial enclosure. (fig. 4.19) This system ranged from a closed circle that indicated a strongly defined space to a floating "X" that represented an undefined space, with various combinations of "X" and circle depicting the spectrum of subjective experience of spatial definition. A space described by a circle and small X, for example, was somewhat defined while one described by a large X and small circle was ill defined.[544] A third symbol system described transitions between the degrees of spatial enclosure and was located above and below the cross sectional diagrams, vertically connecting one section diagram to another (fig. 4.20). A gradual merge was indicated by elongated parentheses while an abrupt shift was conveyed through the use of a horizontal line.[545] The fourth and final symbol system represented the quality of light, represented by the symbols at the farthest right side of the Space Motion Diagram. Lighting was conveyed by shading a small square to represent the general intensity of light from very bright to very dark; a space lit from the front was

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[543] Appleyard, Lynch and Myer, *View from the Road*, 22-23.

[544] A particularly strong spatial experience was not only conveyed by the symbol system, but it was also duplicated on the motion band. A highly defining spatial experience such as extreme constriction or enclosure could be represented by heavy black edges on the motion band that ran along the centerline. Appleyard, Lynch and Myer, *View from the Road*, 22-23.

[545] Appleyard, Lynch and Myer, *View from the Road*, 23.

shown by a white circle overlaid on the square, while a backlit space was symbolized by a corresponding black circle (fig. 4.21).

Of these symbol systems, it is interesting to note that the representation of lighting is particularly idiosyncratic in comparison to the others. While spatial enclosures and the transitions between them would be relatively consistent, barring major construction, the quality of light would be different for each successive trip, even by the same driver. As the authors' purpose was to record the factors that most impacted not just the experience of the roadway, but its design as well, it is puzzling that they chose to develop a symbol system to record such a fleeting impression, which could hardly be used as a consistent and predictable element of design. At the same time, the authors failed to find a way of symbolizing traffic, another admittedly fleeting but much more influential aspect of the roadway experience. The act of driving on a highway at rush hour is completely different from the same drive with only a few other cars, not only in terms of speed of travel, but also in terms of feelings of space and enclosure on the roadway.

The Space Motation diagram, consisting of the motion band and four coordinated symbol systems, was paired with the Orientation Diagram. If the central purpose of the Space Motion Diagram was to convey those aspects of spatial experience and motion that most affected the highway experience, then the main goal of the Orientation Diagram was to represent those aspects of the physical and visual landscape that oriented an observer traveling along a path of motion within the larger environment.[546] The Orientation Diagram consisted of two segments, an image segment showing the path of travel and its relationship to the central elements of the city image, and a goal segment representing the

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[546] Appleyard, Lynch and Myer, *View from the Road*, 24.

location, perception, and attainment of principal visual and physical goals. The Orientation Diagram followed the same time increments as the Space Motion Diagram and was intended to be read in concert with the latter.

The image segment, located at the center of the Orientation Diagram, showed the route taken by the observer and its relationship to the five most perceptually important aspects of the urban image: paths, edges, nodes, landmarks, and districts. These five elements, first described by Kevin Lynch in his book of 1960, *The Image of the City*,[547] were shown at the point along the journey at which they were either physically located or passed. (fig. 4.22) The first element, the "path," was any route that the observer could physically traverse and was represented by parallel vertical lines. The most important path, the one taken by the observer, occupied the centerline of the Orientation Diagram but additional paths – such as those that intersected the observer's line of travel – could also be indicated in the diagram. An "edge" was a defining linear aspect of visual experience that could not be physically traversed, such as a high wall or riverbank that paralleled the route of travel, and was symbolized by short horizontal lines that persisted in the diagram for as long as the given edge was experienced. A "node," represented by a large star shape in the diagram, represented the confluence or meeting point of multiple paths – such as a traffic intersection or city square – that could be physically entered by the observer on his path of travel. "Landmarks" were visually defining elements of the landscape that the observer could not physically enter into along the route of travel, such as buildings next to the highway, high towers in the distance, and large signs.

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[547] *The Image of the City* emerged from the Perceptual Form of the City Study, of which Lynch was also a principal researcher (see Chapters 1-2).

Represented by a triangle, a landmark functioned as a locational marker along the route of travel. Finally, the "district," symbolized by an area of pixilation, was an area that the observer could enter into that was visually defined by some means as homogenous and distinct, such as a characteristic residential neighborhood or large industrial park.[548]

The relationship between these five elements was represented in the image segment of the Orientation Diagram, which showed the continuity of the path, the elements associated with the path, and the points at which the driver was forced to make major decisions.[549] (fig. 4.23) In this way, the Orientation Diagram conveyed not only the location of the various elements passed, but also the ways in which they related to the central path of the observer.[550] This central image segment of the Orientation Diagram was flanked to the right side by goal segment where the location of visual goals sighted on the road ahead could be indicated, as well as points along the journey when they were sighted and eventually passed. (fig. 4.24) Each goal had its own vertical line that persisted from the first sighting of the goal to its final attainment. Triangular projections along the goal's vertical line conveyed those instances along the path of travel when the goal was sighted, from its first sighting to its last. When the goal was seen and reached, a

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548 Appleyard, Lynch and Myer, *View from the Road*, 24.

549 Appleyard, Lynch and Myer, *View from the Road*, 24. Other key features were also highlighted: a point of decision along the path was symbolized, for example, by a dark circle while turns in the path were indicated by curved arrows that signified the direction of motion. The loss of the sense of continuity along the path was portrayed through the use of a solid break in the path along with a question mark symbol. A strong edge that paralleled the path that lost its sense of definition as the observer progressed farther along the path would be conveyed by a decreasing weight of line or tone. Appleyard, Lynch and Myer, *View from the Road*, 24-25.

550 Appleyard, Lynch and Myer, *View from the Road*, 24-25.

larger triangular projection was used to correspond with a landmark symbol in the image segment of the Orientation Diagram.[551]

These notations, for the authors, could be supplemented by maps, photographs, sketches, and study models. (figs. 4.25-4.26) However, they believed that the diagrams, when read in concert with one another, did more to convey the visual effect of the highway experience than all the other tools combined: "With these two diagrams, the one symbolizing space and motion and the other orientation, we can quickly record the essence of the view from the road. It will be necessary to read them together, since the perception of space-motion and of orientation overlap."[552] These abstract symbols, while graphically beautiful, had the unfortunate effect, however, of reducing the experience of multiple and varied spatial urban forms to the same generic representation. A historic town square, for example, would be represented by the same star-shaped node symbol as a busy highway interchange, and the visual goal of a large modern building ahead would be symbolized by the same triangle as a gothic revival church. Thus, although these symbols allowed the authors to quickly sketch these elements of design, it is important to note that they diluted the experience through generic spatial representation, just like Halprin's BART Score and "Score from San Francisco to Sausalito."

In the third chapter of the book, the authors demonstrated how their notation could be used to record the experience of traveling into Boston on the newly-constructed

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[551] If, on the other hand, the goal was obscured instead of clearly passed, no final triangular projection was used. Various modifications to the triangular projections indicated a multitude of visual experiences: the darkening of the line or its attendant projections signified an important or very visible approach and attainment while the inclusion of directional arrows showed the direction in which the sighting was made relative to the path of travel. Appleyard, Lynch and Myer, *View from the Road*, 25.

[552] Appleyard, Lynch and Myer, *View from the Road*, 25.

Northeast Expressway over the Mystic River Bridge. They included both Space Motion and Orientation Diagrams of this journey, (see figs. 4.13-4.14) which was based on the research undertaken by Lynch and Appleyard in the late 1950s for their "Imageability study of the highway" (see Chapter 2). The authors provided extensive textual description of the journey, as well as maps, serial snapshots, and sketch diagrams, all of which were keyed it to their notations so that the reader could follow along and see how the authors' experiences were being symbolized on paper.[553] Over the course of their research for *The View from the Road*, Boston became a laboratory for their notation experiments; indeed, the Northeast Expressway and Central Artery – both constructed in the 1950s – functioned as testing ground as they sought to define the most influential visual aspects of highway design.

In chapter 4, the authors put their notation to the test by applying it to the development of an unconstructed project: a hypothetical design for the proposed circumferential Inner Belt highway around the city of Boston.[554] Situated at the Cambridge-based MIT, Appleyard, Lynch, and Myer paid particular attention to the highway network emerging around neighboring Boston, particularly as the proposed Inner Belt had been designed to cut directly through Cambridge. Although the Central Artery had opened to traffic in 1959, the location of the remainder of the Inner Belt was, through the 1960s, the subject of intense debate among engineers, planners, residents, political leaders, and various agencies and constituencies in the metropolitan community.

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[553] Appleyard, Lynch and Myer, *View from the Road*, 27-37. See especially pages 30-31, where full Space Motion and Orientation Diagrams of the Northeast Expressway trip are shown, as well as pages 32-34, where the trip is described in detail in text.

[554] See Chapter 1 for the development and planned implementation of the Inner Belt concept in Boston.

In the earliest debates, the key issues involved route location, displacement costs, and financial cost of the Inner Belt in the neighborhoods through which it would cut: Roxbury, the Fenway, Brookline, Cambridge, Somerville, and Charlestown.[555] Beginning with its major location restudy of 1962, *The Inner Belt and Expressway System, Boston Metropolitan Area*, the Massachusetts Department of Public Works (DPW) engaged a series of consultants to review the proposed locations and capacities of various portions of the entire Boston highway system.[556] As early as 1963, however, Federick Salvucci of the Boston Redevelopment Authority called attention to the fact that DPW engineering analyses were slanted to favor the state-supported location and solution. Others would claim the same over the following years, particularly in regard to the controversy over the Inner Belt location through Cambridge.[557]

In this context, it is not surprising that, in the early 1960s, Appleyard, Lynch, and Myer would have chosen Boston's Inner Belt – complete with the constructed Central Artery – as a timely and appropriate case study for theoretical redesign. However, rather than consider the multitude of practical, economic, social, and physical factors that had constrained and directed highway route design and location in Boston over the years, the

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[555] Alan Lupo, Frank Colcord and Edmund P. Fowler, *Rites of Way: The Politics of Transportation in Boston and the U.S. City* (Boston: Little, Brown and Company, 1971), 13-14.

[556] See Hayden, Harding & Buchanan, Inc. and Charles A. Maguire & Associates, *Inner Belt and Expressway System, Boston Metropolitan Area* (Boston, 1962). For an analysis of this report and its conclusions, see pages 33-39 in the following text: The Planning Services Group, *The Boston Regional Survey Transportation Inventory, Chapter 4: Highways* (Boston: Planning Services Group, 1962). For later reports commissioned by the DPW, see Sverdrup & Parcel and Associates, Inc., *Basic Design Report: Boston Inner Belt Expressway, I-695 in Boston, Brookline and Cambridge* (St. Louis, MO and Boston: Sverdrup & Parcel and Associates, 1965); and H. W. Lochner, Inc., *Interstate Route 695, Inner Belt Highway, Boston, Cambridge and Somerville: Location Restudy* (Boston: H.W. Lochner, 1967).

[557] Lupo, 14, 16.

authors decided to narrow their focus primarily to design that increased visual impact, attention, and enjoyment. As they wrote:

> We have accepted the basic concept and the general pattern and function of the Central Artery, but have relocated and redesigned it as if no investment had yet been in made in plans, land acquisition, or construction. The criterion governing this imaginary design has been the visual, esthetic experience of those driving on the road. The only constraint imposed was that of general reasonableness as to cost and traffic function. No attempt was made to find the cheapest or the most efficient layout, above this level of general reasonableness. The design is therefore a theoretical construction, not advanced as something better than the present official proposal, but used to illustrate how roads might be shaped if visual form were the dominant criterion. It is obvious that in actual practice other criteria would be of equal or greater importance. But in this early stage of development we can clarify our ideas best by emphasizing the esthetic factor.[558]

They began their study by analyzing the existing structure of the city of Boston, assessing its strengths and weaknesses by examining the relative ease with which it was perceived by its residents.[559] From the air, they contended, Boston's peninsula was uniquely situated, surrounded by water and relatively large open spaces (such as the rail yards and train stations), and possessing a radial street layout that was clear from above. Similarly, the various districts of the downtown area were visually distinct with recognizable landmarks such as the State House at Government Center, the John Hancock Building, and the proposed Prudential tower in Back Bay. However, there were few opportunities for visual connections to these landmarks and others, from Boston harbor to Boston Common the infrequency of views of the skyline. If visual connections

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[558] Appleyard, Lynch and Myer, *View from the Road*, 39.

[559] This information was gleaned from Kevin Lynch's research on Boston, which he published in *The Image of the City* in 1960. Appleyard, Lynch and Myer, *View from the Road*, 40.

to these landmarks were provided, the driver could more easily orient himself within the city's larger structure.[560]

Keeping these strengths and weaknesses in mind, the authors surveyed the entire length of the proposed route, as detailed in the Maguire Plan of 1948 (see Chapter 1). They studied "the character of the districts passed through, the possible landmarks, nodes, vistas, etc. Excursions were made off the route to gain an idea of possible alternative locations."[561] Extensive field reconnaissance was undertaken from different viewpoints, heights, and speeds of travel: "The designer must place himself in the position of the motorist traveling along a road that isn't there. He imagines buildings cleared away and new buildings where none now exist. He pictures the future form of the road in front of him, placing himself high up in the air." The authors examined both the static view and the dynamic view, traveling the general alignment of the official route as closely as possible from behind the wheel of a car, noting that such study was illuminating, even if it did not exactly follow the proposed location. They asserted that "present expressway designers who are not accustomed to using these or equivalent methods must have very little idea of the visual experience they are creating, or of the possibilities that they have within their power. They are working blind."[562]

One of their primary goals in the imaginary design of the Inner Belt was to demonstrate how a visually designed circumferential highway could improve orientation

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[560] Appleyard, Lynch and Myer, *View from the Road*, 40. See page 41 for a graphic representation of the existing city structure compared to the composite image structure held by the city residents surveyed in *The Image of the City*.

[561] Appleyard, Lynch and Myer, *View from the Road*, 42.

[562] Appleyard, Lynch and Myer, *View from the Road*, 42.

within the city and help the driver locate himself on the highway in relation to major landmarks so that he would have to make fewer stressful decisions in heavy traffic.[563] They believed that this could be achieved through an expressway design that allowed for repeated and rhythmic visual contact with the center city. The official route, they contended, which ranged fairly far northwest into Cambridge and southwest into Roxbury, took a loop around Boston that was much too wide.[564] Moreover, the consistent circularity of the official route had the potential to cause significant confusion, disorientation, and distortion in the driver's city image, particularly as the degree of curvature would be relatively difficult to discern at high speeds.[565] As a solution, they proposed a significantly tightened Inner Belt that ran much closer to the center of the city to allow sightlines to the city center from all parts of the road.[566] (fig. 4.27) Their design was composed of a "ring" that was relatively more triangular than circular, consisting of three legs that were deliberately designed to have their own visual character, distinguishing eccentricities, and consistent directionality.[567] They presented the "structure" of the trip on a map diagram that indicated various landmarks and the interconnections between the three legs of the highway.[568] (fig. 4.28) Each of the apexes of the triangle were oriented to a cardinal point: north, south and west (Boston harbor was

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[563] Appleyard, Lynch and Myer, *View from the Road*, 45.

[564] They contended that this was particularly the case in the western portion of the route, which traveled low through residential areas and lost all sense of contact with the city center. Appleyard, Lynch and Myer, *View from the Road*, 45.

[565] Appleyard, Lynch and Myer, *View from the Road*, 45.

[566] Appleyard, Lynch and Myer, *View from the Road*, 45.

[567] Appleyard, Lynch and Myer, *View from the Road*, 45.

[568] Appleyard, Lynch and Myer, *View from the Road*, 46.

located to the east) and each of the radial expressways emptying into the Inner Belt from around the city would be gathered at one of these three points.[569] Progression and orientation towards either the older or newer city center was a determining factor in the layout of their route.[570] (fig. 4.29) Views were also noted to key landmarks outside the Inner Belt, so that the driver could orient himself to the exterior, a particularly important fact when seeking the exit ramp for the correct radial.[571] The development of rhythmic detail and city sightlines notwithstanding, it is important to note that their unyielding commitment to visual and aesthetic concerns is highly questionable here. The concept of taking so much land so close to the center of such a densely developed city as Boston posed not only intense economic conflicts, but also political and topographical, particularly as the freeway revolts of the late 1950s and early 1960s had already called into question the feasibility of constructing extensive highway projects in downtown areas.[572]

In their hypothetical design, the "Riverway," or the leg of the triangle that stretched through Cambridge, was designed to enable visual access and orientation to the Charles River in scripted sequences of exposure, enclosure, and elevated views.[573] The leg of the triangle stretching across the city center and roughly following the path

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[569] Appleyard, Lynch and Myer, *View from the Road*, 45.

[570] Appleyard, Lynch and Myer, *View from the Road*, 46.

[571] Appleyard, Lynch and Myer, *View from the Road*, 47.

[572] See Chapter 2 for more on the Freeway Revolts, which began in 1959 in San Francisco.

[573] The authors were careful to note, "It is not necessary to follow along the very banks to maintain a feeling of contact with a river. The different relationships that the road has with the river along this leg will tell much more about the nature of the river than would a road that merely parallels it" (Appleyard, Lynch and Myer, *View from the Road*, 49).

established by the Central Artery was called the "Centerway." Unlike the constructed Central Artery, which the authors criticized for lack of views to the harbor, an unchanging elevated level that failed to promote a sense of arrival, and poorly planned views to the center city,[574] their proposed Centerway was carefully choreographed to combine views of the ocean and the central city, descending from its elevated structure to ground level and, at times, below, to increase contact with downtown landmarks, allow the driver to locate himself within the city fabric, and introduce visual and physical climaxes within the sequence.[575] The third leg, called the "Crossing," extended from the southernmost tip of the Centerway, passed southwest of Back Bay, and connected up with the westernmost tip of the Riverway. This route was close enough to the city to enable good views of the Prudential Center and John Hancock tower (the newer city center) while threading through the Fenway on curves that both echoed the natural landforms and enabled good outward views.[576]

In order to create their Space-Motion and Orientation Diagrams for their proposed design, they straightened the route, breaking the legs apart at the three corner intersections. Representing the entire highway experience on one page allowed it to be continuously read in sequence from the bottom of the page upwards. Although "films might present this material in the sharpest way… a graphic technique, reproducible on paper, is needed for speed, economy, and communication to a large audience."[577] Their Space Motion Diagram of the hypothetical journey was accompanied by landmark

[574] Appleyard, Lynch and Myer, *View from the Road*, 53.

[575] Appleyard, Lynch and Myer, *View from the Road*, 49.

[576] Appleyard, Lynch and Myer, *View from the Road*, 49.

[577] Appleyard, Lynch and Myer, *View from the Road*, 51.

descriptors such as “Custom House Tower” and “Fenway Park Stadium” that allowed the reader to orient himself within the larger journey. (fig. 4.30) The Orientation Diagram contained similar tags within the image segment notation as well as along the goal segment, clarifying for the reader which landmark he was approaching at a given point along the way. (fig. 4.31) The authors illustrated their Proposed Belt Route design with several other diagrams, including one that captured road details such as advertising signs, road detail, and pavement. (fig. 4.32). The authors developed a proposed design for major intersections as well as entrance and exit ramps, with large lamps that would illuminate the curves in the dark to improve orientation at night.[578] (fig. 4.33) They suggested that pavement texture and color could be varied on each leg to reinforce the driver’s position within the Inner Belt ring, which would aid the driver in navigating major intersections.[579]

To further represent the journey, the authors used sketch diagrams meant to be experienced as if on flip cards. At the bottom corner of each page, starting from the very first, was a sketch of one moment in the journey around Boston on the hypothetically designed Inner Belt. (fig. 4.34) The reader was instructed to begin on the bottom left corner of page 2 and flip forward to 64, then turn to the botrom right corner of page 63 and flip backward again to page 1.[580] These sketches were combined into a single sequence on two and a half spreads within the book, accompanied by textual commentary

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[578] Appleyard, Lynch and Myer, *View from the Road*, 54, 57.

[579] Appleyard, Lynch and Myer, *View from the Road*, 54-55.

[580] Appleyard, Lynch and Myer, *View from the Road*, 58.

describing, in detail, the spatial, visual, and kinesthetic experiences of the driver.[581] To this was also added a diagram that indicated the "tempo of attention" along the road, meant to indicate the relationship between the three intersections and the various climaxes along the road that were scripted in between them. (fig. 4.35)

Despite the extensive description and attendant photographs and sketches, these notational diagrams would likely not have been immediately legible and understandable to a reader. Not only were the symbols and framework entirely foreign to most readers, but the authors' approach of representing a circumferential highway as a straight line would have been relatively difficult for all but the most spatially gifted to interpret. The drawings did, however, allow for the incorporation of spatial, visual, and kinesthetic experiences that typical highway drawings (maps, sections, and elevations) ignored. By focusing on these experiences in locating an imaginary Inner Belt, the MIT authors were therefore calling attention to the importance of these characteristics in design. Although these were not and should not be the determining factors in highway route location,[582] the authors argued that an incorporation of these elements into urban highway design could not only improve the experience along the highway, but also strengthen the driver's understanding of and orientation to the larger city environment. In the fifth and final chapter to their book, the authors openly admitted that they deliberately ignored the view *of* the road, writing:

> We have neglected this aspect of the road partly because it is currently receiving some attention, and partly because our work required a sharper focus. The effect

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[581] See Appleyard, Lynch and Myer, *View from the Road*, 58-62.

[582] Several times throughout the text, they are careful to note that visual considerations should be added to comprehensive highway design and route selection, not substitute for it. See Appleyard, Lynch and Myer, *View from the Road* 2, 39, 63.

> of the road on its surroundings is an extremely important aspect of its design, and this inward view must be integrated with the outward view. Unfortunately, the two views are radically different by nature. How may they be co-ordinated, or at least prevented from conflicting with each other? When the driver wants an elevated platform from which to view his surrounding, while the stationary citizen wishes the road to be out of sight, how do we arbitrate the issue?[583]

The MIT authors' deliberate oversight of the pedestrian perspective was attacked in several critical reviews in the years following the book's publication in 1964. In 1966, Nathan Silver stated the following in *Progressive Architecture*: "the idea of a visual analysis of the highway that ignores 'how the highway looks from the outside' is absurd."[584] Silver continued, writing of their redesign of the Inner Belt: "'The View from the Road' that we see can never really be Boston unless we simultaneously read the view from Boston of the road."[585] In another review from the same year, David Lowenthal asserted, "We should also learn about the visual impact of roads on residents and pedestrians, of whose milieu the highway also form part – all too often an intrusive part, jarring in appearance, daunting in scale, disruptive in location."[586] Although Lowenthal approved of the techniques of the book and its search for a "composite subjective landscape," "showing what people actually saw, how they saw it, and how they related it to themselves," he found the notation system to be inaccessible and unnecessary. He wrote: "The symbols are so numerous and varied – some are wholly abstract, others

[583] Appleyard, Lynch and Myer, *View from the Road*, 63.

[584] Nathan Silver, "The Movement Movement," *Progressive Architecture* 47 (December 1966): 184.

[585] Silver, 186.

[586] David Lowenthal, "The View from the Road," *Economic Geography* 42 no. 3 (July 1966): 277.

ideographic, still others pictorial – that the notations convey little of the general impression and can be interpreted in detail only with considerable effort."[587]

A similar sentiment was published in 1965 by urban planner Boris Pushkarev, in a review of *The View from the Road* that he wrote for the *Journal of the American Planning Association*. Pushkarev, who had published his own treatise on highway esthetics in *Man-Made America: Chaos or Control?* in 1963 (see Chapter 1), criticized the authors' "somewhat esoteric 'sequential form notation" as a manifestation of an "academic temptation of unnecessary originality."[588] He wrote: "To pose the problem of 'recording and communicating' visual sequences as a prerequisite for their deliberate design is logical enough…. [but] one is left wondering whether the torture of inventing a new language *á la* ballet notation was necessary to achieve this. This reviewer feels that the analytical methodology is redundantly elaborate for the problem at hand, and that the obscure symbolic notation will hinder, rather than facilitate communication with professional engineers."[589] Pushkarev concedes that their conceptual redesign of Boston's Inner Belt "is esthetically much superior to the official plan. It replaces a rather irregular and arbitrarily floating belt with a new determinate triangular plan successfully inscribed into the street order and offering a meaningful progression of views."[590] However, he did note that a "more direct design approach"[591] could have yielded a similar

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[587] Lowenthal, 277.

[588] Boris Pushkarev, "Book Review: The View from the Road, by Donald Appleyard, Kevin Lynch, and John R. Meyer," *Journal of the American Planning Association* 31 no. 3 (1965): 267.

[589] Pushkarev, Book Review, 267.

[590] Pushkarev, Book Review, 267.

[591] Pushkarev, Book Review, 267.

solution, implying that their notation system was not a necessary ingredient to the success of their design strategy. It is interesting to note that the authors of *The View from the Road* were well aware of the work of Pushkarev but considered his work to narrowly pertain to Road Alignment, which was, for Appleyard, Lynch, and Myer, only one among many factors to consider. The MIT authors moreover described Pushkarev's publications as merely "techniques for gaining a specific effect, not basic principles."[592]

It is not surprising, considering the fact that both Pushakrev and the MIT authors were essentially planners writing about highway aesthetics, that one review from 1966 sought to compare the two. In *Connections*, the publication of the Harvard Graduate School of Design, David Basch attacked both works for using an approach that was not only intuitive but also lost in the indeterminate realm of pure aesthetics. Basch disagreed with the foundational premise of both works – that the highway could and should be considered as a work of art – and described their theories as esoteric and impractical. Basch was skeptical that the symbols used by the MIT authors effectively conveyed their intended visual effects and stated, moreover, that "the quality of what Appleyard's symbols represent cannot be approximated; hence, his notation is useless to designers."[593] In response to this review, Appleyard submitted a letter to the editor that was published in the journal's next issue, in which he defended their notation system as well as the methodology used in their study. He emphasized that their criteria did not emerge randomly from the prescripts of aesthetic theory, but rather from their surveys and

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[592] See footnote on page 10 of *The View from the Road*, in which the MIT authors mention Pushakrev's work as well as Cron's. See Kemp, 785-790 for a discussion of urban design research at MIT and how it related to The Complete Highway and the work of Pushkarev.

[593] David Basch, "Highway Aesthetics: A Second Look," *Connection* (Winter 1966): 38.

analyses of the actual experience of driving on the highway. As he wrote, "Since the principles of aesthetic theory and the discoveries of the cognitive and personality needs and processes appear to be converging, this does not seem an imprudent move. In fact, we have found it convincing and rewarding, and are in the process of testing many of our admittedly speculative judgments through more interviews."[594] In defense of their notation system, Appleyard simply wrote: "A good notation system is a compromise between true simulation and the designer's capacity to manipulate it in design. Our system is not the only possible one, but we find it workable, we continually modify it, and we can design with it."[595]

Appleyard's defense notwithstanding, the concept of the highway as a work of art seemed to bother many reviewers. In his *Progressive Architecture* review, Silver was particularly incensed by their theory of highway design, which he called "analytical-picturesque:"[596]

> In a country where the largest sums of public money for cities in the past generation have been spent on urban highways, it would be a national disaster if highway commissions were given license to 'act intuitively' about urban aesthetics…. Highways have always been the work of civil engineers and their consultants for the very good reason that engineering is supposed to be a scientific discipline. Any highway aesthetic that steps beyond the limits of *strict economy of means to solve the defined need* is indeed an 'outrageous idea' in a city of many paths and purposes.[597]

Thus, although many of the reviewers approved of the methodology and purpose of the study and even the theoretical redesign of Boston's Inner Belt, the majority nonetheless

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594 "Letters and Responses: Highway Aesthetics," *Connection* (Spring 1966): 7.

595 "Letters and Responses," 7.

596 Silver, 184.

597 Silver, 186.

questioned the book's conviction that the highway could function as a work of art and were unable to imagine a significant role for visual or aesthetic criteria in a practice dominated by practical engineering principles.[598]

Compared to the overwhelmingly positive response garnered by Lynch's *The Image of the City*, the critical reactions to *The View from the Road* were decidedly less encouraging. *The Image of the City* provided a way for urban designers to understand how a city was structured and was based on interviews with residents who saw the city from the pedestrian perspective. *The View from the Road*, however, single-mindedly placed the visual and aesthetic concerns of the automobile driver ahead of all pedestrian concerns. The former sought to strengthen the existing city image by mapping meaningful places such as landmarks and districts; the latter attempted to do the same but did so paradoxically, by recommending significant upheaval in the center city and its fabric, a fabric whose interconnected and densely woven nature Lynch had celebrated only four years prior. By stating that they were going to focus solely on the visual, the authors absolved themselves of their responsibility as planners to design comprehensively, indulging in a fantasy of highway design that was based solely on visual and aesthetic factors. Following the publicity given to Lynch's integrated approach of *The Image of the City*, which drew on the perspective of the city resident, it may have been this absolution of responsibility that caused reviewers to react so negatively: they expected more from Kevin Lynch and his fellow authors.

[598] For a brief yet entirely positive review of *The View from the Road*, see Frederick Gutheim, "Townscapes and Turnpikes," *The Nation* 200 no. 23 (June 7 1965): 622.

CHAPTER 5

Although *The View from the Road* was not published until 1964, Lynch had already begun to consider in 1963 the ways in which he could combine his research on *The View from the Road* with the concepts in *The Image of the City*.[599] In a "Statement of Research Intent" from Spring 1963, Lynch proposed a research project at MIT on the Visual Form of the Metropolis. In this project, he intended to "pick up the study of the visual form of the city, at the metropolitan scale," examining its elements, models for visual structure, means of representation, and visual criteria for design, and determine whether a policy of metropolitan visual form could be developed.[600] He intended to focus on issues of imageability and congruence between visual form, activity patterns, organization, and rhythm.[601] Lynch proposed to build on his earlier work, specifically his

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[599] In his later years, Lynch published several articles analyzing his early research on *The Image of the City*. Although *The Image of the City* was his earliest book, it continued to be one of his most well-known and influential works. See, for example, Kevin Lynch, "Quality in City Design," In *Who Designs America?*, ed. Laurence B. Holland, 120-171 (New York: Doubleday & Co, Inc., 1966); Kevin Lynch, "Some References to Orientation," in *Image and Environment: Cognitive Mapping and Spatial Behavior*, ed. Roger M. Downs and David Stea, 300-315 (Chicago: Aldine Publishing Company, 1973); and Kevin Lynch, "Reconsidering the Image of the City," in *Cities of the Mind: Images and Themes of the City in the Social Sciences*, ed. Lloyd Rodwin and Robert M. Hollister, 151-161 (New York: Plenum Press, 1984). Also see the following, all published in Banerjee and Southworth, *City Sense*: Kevin Lynch, "Analyzing the Look of Large Areas: Some Current Examples in the United States," 1974 (p. 338-347); Kevin Lynch, "A Process of Community Visual Survey," (p. 236-286); and Kevin Lynch, "Environmental Perception: Research and Public Policy" (p. 239-246). The latter two citations are undated but can be reliably approximated to the late 1970s based on other in-text citations made by Lynch.

[600] Kevin Lynch, "Statement of Research Intent, Spring 1963," Kevin Lynch Papers, MC 208, unprocessed box 4a, folder "Metro Image (2 of 2)," Lynch MSS, 1.

[601] Lynch, "Statement, Spring 1963," 1.

"speculations on metropolitan form in 'The Image of the City,'" and "the techniques for designing highway sequences built up in 'The View from the Road.'"[602] Ultimately, he hoped to publish a "Monograph on Metropolitan Visual Form" that would address the question of metropolitan visual policy, design, and representation.[603]

Although such a monograph was never published, Lynch prepared copious notes and research on the issue of discerning, representing, and designing visual form at the metropolitan scale.[604] In an unpublished draft titled "The Visual Shape of the Shapeless Metropolis" from 1964, the same year in which *The View from the Road* was published, Lynch knitted his research on highways, path structures, and their potential for contributing to metropolitan image into his larger discussion on creating a visually coherent metropolitan form.[605] For Lynch, the three crucial elements of metropolitan form were a city's major pathways – including streets, railway lines, and promenades – as

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[602] Lynch, "Statement, Spring 1963," 2.

[603] Kevin Lynch, "Outline for Possible Monograph on Metropolitan Visual Form," n.d., Kevin Lynch Papers, MC 208, unprocessed box 4a, folder "Metro Image (2 of 2)," Lynch MSS, 1. Although this document is undated, it is attached to his "Statement of Research Intent, Spring 1963" and addresses the same issues raised in his "Statement," making it likely that both documents were either prepared simultaneously or presented together.

[604] Although Lynch never published a monograph of this title and subject, many of the same issues were eventually covered in *Managing the Sense of a Region* (Cambridge, MA: MIT Press, 1976). For more on this latter book and how it relates to Lynch's other publications, see Donald Appleyard, "The Major Published Works of Kevin Lynch," *Institute of Urban and Regional Development* no. 158 (October 1978): 555-556. In his article, Appleyard also notes that Lynch began a book on metropolitan form in the 1960s but never completed it, instead publishing his ideas on the topic in different context in two books from following decade: *Managing the Sense of a Region* and *What Time is this Place?* (Cambridge, MA: MIT Press, 1972). See Appleyard, "Works of Kevin Lynch," 553.

[605] Although Lynch never published this text himself, it was published posthumously in 1990 in Banerjee and Southworth's *City Sense*, where the editors indicate that Lynch's draft is undated. Kevin Lynch, "The Visual Shape of the Shapeless Metropolis," in Banerjee and Southworth, *City Sense*, 65-86. However, on the original draft that exists in the Lynch MSS, the date "1964" is inscribed in pencil on the last page of the document. Kevin Lynch, "The Visual Shape of the Shapeless Metropolis," Kevin Lynch Papers, MC 208, unprocessed box 4a, folder "Metro Image (1 of 2)," Lynch MSS, 36. It is likely that the draft was indeed written in the early to mid-1960s, as his "Statement of Research Intent" is dated 1963 and proposed to follow-up on the recently completed manuscript for *The View from the Road*.

well as its major centers and special districts.[606] A plan detailing the major metropolitan paths would not only address their sequential structure (whether progressive, climactic, or otherwise) but also define their principal entry and climax points, the design of their intersections, connections to local paths, and the character of space and movement along their length.[607] Lynch emphasized the importance of developing coherent, organized, and meaningful sequences along these paths[608] and suggested that each path have its own "gradient of character… to distinguish one direction from its opposite. Each line will have a strong recurrent 'endless' visual sequence so arranged as to reinforce the intersecting sequences, and its rhythm will increase in tempo near the center of the region."[609] His focus on developing sequences along paths – a central theme of *The View from the Road* – was only one part of the complicated process of developing visual form at the metropolitan scale. Thus, in "The Visual Shape of the Shapeless Metropolis," Lynch began to tie the theory behind the notation into the manifold larger processes of urban design.[610] It is possible that this text was a response to the negative reviews of *The View from the Road*, but it may also have been that Lynch planned to fold *The View from*

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[606] Lynch, "Visual Shape," in Banerjee and Southworth, *City Sense*, 69.

[607] Lynch, "Visual Shape," in Banerjee and Southworth, *City Sense*, 69.

[608] Lynch, "Visual Shape," in Banerjee and Southworth, *City Sense*, 74-75.

[609] Lynch, "Visual Shape," in Banerjee and Southworth, *City Sense*, 84.

[610] See also Lynch's handwritten notes on metropolitan visual form, including "Metro study," Kevin Lynch Papers, MC 208, unprocessed box 4a, folder "Metro Image (1 of 2)," Lynch MSS; and "Static plane patterns," "Sequence types," and his sketches on nodes, arterials, freeways, pleasureways, and radials, all located in Kevin Lynch Papers, MC 208, unprocessed box 4a, folder "Metro Image (2 of 2)," Lynch MSS. It is interesting to note that in a draft discussing "general policies for a metropolitan open space system in Boston" from October of 1966, Lynch wrote about the potential for incorporating three specific path structures into Boston as a way of increasing recreational potential: scenic roads, back roads, and an extensive trail system, each with its own range of visual character, road alignment, and "views from the road." See Kevin Lynch, "Rough sketch for discussion: Some general policies for a metropolitan open space system in Boston," Kevin Lynch Papers, MC 208, unprocessed box 14, folder "General Policies for a Metropolitan Open Space System in Boston, 1966," Lynch MSS, 3-4.

the Road into this larger analysis even before *The View from the Road* was published, as evidenced by his "Statement of Research Intent" from 1963.

In March of 1964, at the same time that Lynch was conducting his early research on the visual form of the metropolis, he was invited by the Town of Brookline, MA to carry out a visual survey and analysis as part of the town's Community Renewal Program (CRP). Brookline was one of over 100 towns and cities that were developing a CRP, which had been authorized by the Housing Act of 1959 but not initiated at the local level until the early 1960s.[611] Like many other CRP's being undertaken across the country, Brookline's was concerned with identifying the areas of the town that were blighted or deteriorating and assembling a course of action to address sources of urban decay, prepare for change, and encourage urban growth. Brookline proposed to undertake its CRP through a series of extensive facilities surveys, housing analyses, and studies on land use, economics and marketability. The visual analysis would complement these other studies and contribute to the broad framework of the CRP. Ultimately, it was hoped that the visual analysis would aid the town in developing a comprehensive set of urban design goals and yield "a refined concept of environmental quality."[612]

Lynch began working on Brookline's visual analysis in 1964 with two research assistants, John Corrie and Alan Forrester.[613] His goal was to "analyze the present visual

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[611] By 1961, roughly a score of cities (including New York, Chicago, and Pittsburgh) had applied for federal grants for Community Renewal Programs; by 1963, that number had risen to over one hundred. See Mel Scott, *American City Planning Since 1890* (Berkeley: University of California Press, 1969), 596-598.

[612] Letter, Arthur O'Shea (Executive Secretary, Brookline Selectmen's Office) to Kevin Lynch, 30 March 1964, Kevin Lynch Papers, MC 208, unprocessed box 6, folder "Brookline," Lynch MSS, 1.

[613] Under the section on "Staff for this study" on the back cover of the final report, the names of John Corrie and Alan Forrester are listed under "Kevin Lynch, Planning Consultants." Although Lynch never specifies the capacity in which Corrie and Forrester were working for him, it is most likely that they were graduate students of his at MIT, a fact that is implied from the correspondence between Kevin Lynch and

condition of the Town as a whole, pointing out the difficulties and assets, and… suggest what visual objectives should guide future planning."[614] Over the summer of 1964, the team executed an extensive visual analysis of the town, which was carried out in two parts by Corrie and Forrester and completed under Lynch's supervision.[615] The portion of the study undertaken by Corrie consisted of a visual sequence summary along twelve of the town's major roadways and two of its transit routes. This summary recorded the major experiences of space, motion, and visual structure while in movement along the town's major arterials.[616] In preparing the summary, Lynch asked Corrie to note many of the same characteristics highlighted in *The View from the Road*, including the "sequence of space & motion, sense of traffic & adjoining activity, significant forward views…

Paul Zucker in 1965. See Letter, Paul Zucker to Kevin Lynch, 6 August 1965, Kevin Lynch Papers, MC 208, unprocessed box 6, folder "Brookline," Lynch MSS, 2-3.

[614] Letter, Kevin Lynch to Paul Zucker (Brookline Planning Board), 27 May 1964, Kevin Lynch Papers, MC 208, unprocessed box 6, folder "Brookline," Lynch MSS.

[615] All of the archival material on Brookline in the Lynch MSS notes work undertaken by Corrie and Forrester under Lynch's supervision. See in particular the three-page "Brookline Work Program" attached to the letter from Lynch to Zucker on 27 May 1964, which divides the proposed work into stages and by the team member in charge of a given task. Corrie was responsible for all sequence analyses while Forrester was responsible for visually analyzing all centers, districts, and areas. Kevin Lynch, "Brookline Work Program," attached to Letter, Lynch to Zucker, 27 May 1964, Lynch MSS, 1-3. See also the hand-written directions Lynch addressed to Corrie and Forrester, respectively, directing them on the specific methods and techniques of the study, as well as the particular characteristics and qualities to which they should pay particular attention. Notes from Kevin Lynch to John Corrie, "Corrie," n.d., and Notes from Kevin Lynch to Alan Forrester, "Forrester," n.d., both in Kevin Lynch Papers, MC 208, unprocessed box 6, folder "Brookline," Lynch MSS. Both Corrie and Forrester also prepared summaries of the techniques used and elements recorded in their respective tasks in separate memos to Lynch. John Corrie, "Notes on the Method of Sequence Analysis Used in the Brookline Visual Study, 1964," and Alan Forrester, "Survey Method: Visual Districts and Centers, n.d.," both in Kevin Lynch Papers, MC 208, unprocessed box 6, folder "Brookline," Lynch MSS. Although some of the documents cited in this note are undated, the visual surveys and analyses were carried out in 1964, as noted in the final report submitted to Brookline in 1965. Kevin Lynch, Planning Consultants, *Visual Analysis: Community Renewal Program, Brookline, Massachusetts, September 1965* (Cambridge, MA, 1965), 3.

[616] Lynch, *Visual Analysis*, 37.

sense of districts, foci, edge, or other paths… location & nature of entries or decision points, general clarity & rhythm of route and its decision points."[617]

Although the majority of Corrie's survey drawings no longer exist, it is clear from the two diagrams of Harvard Street published in the final report of 1965 that Corrie employed the principles of the notation developed in *The View from the Road* in the recording of his sequence summaries, albeit in simplified form.[618] Both diagrams used the same basic symbols and framework shown in the book.[619] In the Space Motion Diagram, the motion band indicated spatial sensations of rise and fall while arrows showed views toward major landmarks. (fig. 5.1) However, the supplemental symbol systems – such as the cross-sectional diagrams, quality of light, and spatial transitions – were not included, yielding a more basic version of the system that illustrated only major spatial events instead of attempting to record nuances of experience as in *The View from the Road*. In the structure diagram, similar in concept to the Orientation Diagram of 1964, locations of principle views and goals along the route, as well as their duration of view, were indicated to either side of the image segment. (fig. 5.2) The elements of the city image were also noted, such as nodes (indicated by an X), landmarks (represented by triangles and stars), and districts (shown through dashed and hatched lines). The

[617] Lynch, "Corrie," 2. See also Lynch, "Brookline Work Program," 1-2, for tasks assigned to Corrie.

[618] In the final report, Lynch notes that "sets of analytical diagrams for each line studied are on file in the planning office," referring to the two space-motion and two structure diagrams recorded for each of the fourteen routes studied. However, it appears that the original survey drawings completed for the study no longer exist in the Brookline planning office, due to the multiple relocations of the office and the changeovers of several directors. Jay Woodward (retired planning director of Brookline) in phone conversation with the author, 4 September 2009. The only two drawings that remain are those that appear in Figure 10 of the published report of 1965. Lynch, *Visual Analysis*, Fig. 10, n.p.

[619] Indeed, Lynch recommended that Corrie "see my studies for one possible graphic system, see your own for others" when directing Corrie in the preparation for his portion of the visual analysis, calling attention, it can be assumed, to *The View from the Road*. Lynch, "Corrie," 2.

simplification of both diagrams functioned to benefit the overall legibility of the notation by eliminating many of the extraneous symbol systems and allowing the reader to focus on major landmarks and views. Moreover, in both diagrams, turns in the path were indicated as if in plan, rather than in the straight route favored in *The View from the Road*, which made it easier to understand how the various straightaways and curves of the journey adjoined and related to one another.

Lynch noted in the report that these two published diagrams of Harvard Street were examples of the diagrams prepared for each the fourteen routes around the town. By the time the survey was complete, Lynch explained, each route had been represented through space/motion and structure diagrams in both directions along the route's length, resulting in four total such diagrams for each of the fourteen routes.[620] In addition to the visual sequence summaries prepared by Corrie, an analysis of the visual character of the major areas, districts, and centers of the town was carried out by Alan Forrester. Forrester's reconnaissance yielded in-depth map diagrams of the visual structure of the town, presented from an abstract aerial perspective, that detailed the visual characteristics of the town's homogenous areas, its loci of disorientation and confusion, and how each district related (or failed to relate) to the town's larger structure.[621]

Lynch combined the data from Corrie's and Forrester's visual surveys with an analysis of interviews with Brookline residents in order to determine the visual

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[620] Lynch, *Visual Analysis*, 39. Lynch notes that a fifth diagram was also prepared for each route, which brought the two directions together along with a summary of the route's assets and problems, although a visual example of such a diagram was never published with the report. In his summary of method, Corrie also referred to the preparation of space/motion and structure diagrams for each of the routes he studied. Corrie, "Notes on the Method of Sequence Analysis," 1.

[621] See Lynch, "Forrester," 1-2; Lynch, "Brookline Work Program," 1; Forrester, "Survey Method," 1-2; and Lynch, *Visual Analysis*, 39-42.

potentialities and assets of the town. As Lynch noted, although Brookline had a number of important historic landmarks, the majority of them could not be seen from the major roadways. This made it difficult for the driver to orient himself to the larger city fabric and led to confusion in the overall city image.[622] In addition, Lynch observed that there were relatively few roadways in the town that developed any degree of sequence or rhythm of visual elements along their length. He concluded that driving on the main streets was a chaotic experience and that the streets themselves were ugly and failed to convey the character of the town.[623] He recommended combinations of paving, lighting, landscaping, signage, and street furniture to imbue each road with its own unique identity, create memorable sequences, and direct movement in order to clarify the driver's location within the overall city structure.[624] Lynch also examined, among other things, the relationship of the town's streets to the larger network around Boston, the visual quality of the town's residential areas and town centers, and the visual and physical interrelationships of its major districts.

Lynch noted that visual considerations were only one part of the greater approach of Community Renewal Planning and that his recommendations should contribute to the creation of an overall, comprehensive plan for the town.[625] Thus, in the visual analysis of Brookline, the notation was only one part of a much larger examination of visual urban form: it assumed the role of a tool to aid in the consideration of visual sequence along the roadway, rather than as an end in itself. The notation scores from this study, particularly

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[622] Lynch, *Visual Analysis*, 18-19.

[623] Lynch, *Visual Analysis*, 19.

[624] Lynch, *Visual Analysis*, 20.

[625] Lynch, *Visual Analysis*, 1-35.

the roadway sequences prepared by Corrie, seem to have contributed to Lynch's assessment of the visual strengths and – more often – visual shortcomings of Brookline's roadways.[626] It is possible that the process of sheer repetition through which the notation was created, on multiple trips and in both directions along the town's roadways, did more to convey the structure of the town than the notation itself. However, certain key factors for Lynch – such as the visibility of principal landmarks from the roadway – would have been easily discernable from a perusal of the notation system, which indicated such items with symbols such as a triangle or star. As was the case with the notation published in *The View from the Road*, the distillation of varied landmarks to the same set of symbols in the Brookline Visual Analysis functioned to dilute the representational power of the notation system. As an accurate map of the space and motion experience, the notation was rather simplistic and difficult to interpret; as a record of major views and landmarks, however, it seems to have been quite helpful in determining the overall visual structure of the town.

Halprin's "Motation"

At the same time that Lynch was incorporating his recently-developed notation system into his report on the visual analysis of Brookline, Halprin was preparing to

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[626] It is interesting to note in regard to the process of visual analysis that Lynch acknowledged his work on Brookline "may be the most systematic attempt to date. Therefore, many of the procedures are untried, and must be tested over a period of planning and construction" (Lynch, *Visual Analysis*, 3). Lynch also noted several other visual analyses that were in the process of being carried out, many of them inspired by his original book of 1960. These studies include the following: Pittsburgh Regional Planning Association, "Oakland: A Plan for Pittsburgh's Cultural District" (Pittsburgh: Pittsburgh Regional Planning Association, 1961); Blair and Stein Associates, *Memorandums # 5, 6, 7: Visual Analysis- New Bedford Central Area* (Providence, RI: Blair and Stein Associates, 1962); Paul D. Spreiregen, "The Practice of Urban Design: Guide Lines for the Visual Survey," *AIA Journal* 39 (April 1963): 79-94; and *Toward a New City: a preliminary report on Minneapolis' Urban Design Pilot Study* (Minneapolis, MN, 1965).

publish a new version of his own notation system in the journal, *Progressive Architecture*. Over the years, Halprin had established a relationship with the journal and its publishing house, Reinhold. Four articles written by Halprin or about his projects appeared in the journal between 1958 and 1962, and his first landmark book, *Cities*, was published by Reinhold in 1963. In fact, *P/A* had been trying to induce Halprin to publish an article that expanded upon the movement notation scores he published in *Cities* since 1963,[627] but Halprin did not act upon the invitation until the end of the following year, in 1964."[628] It is interesting to note that although the notation-based design that Halprin undertook for BART (see Chapter 4) never came to fruition, his BART Score may have spurred his interest in standardizing his notation system, as his work on "Motation" began in the fall of 1964, less than two months after completing the score.[629]

In July of 1965, Halprin's article finally appeared in *Progressive Architecture* under the title "Motation," short for "movement notation."[630] In the introduction to the

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[627] Letter of interest from P/A was dated 19 November 1963 but book launch was officially held on 22 November 1963. Reinhold Publishing Corporation, Invitation to publication party and book launch for Cities at Halprin's Office in San Francisco, 5-7pm, Friday, November 22, 1963, Folder "Cities - review," call no. 014.I.A.5123, Halprin Collection. See also Letter, C. Ray Smith to Larry Halprin, 19 November 1963, Folder "Motation - article," call no. 014.I.A.6091, Halprin Collection.

[628] Letter, C. Ray Smith to Larry Halprin, 19 November 1963, Folder "Motation - article," call no. 014.I.A.6091, Halprin Collection.

[629] The *BART Score* is dated to 29 July 1964; a letter from Halprin's office to P/A affirming their interest in further exploring their notation system is dated 21 September 1964. By 2 November 1964, the office had sent P/A a brief outline for the proposed article and manuscript preparation and editing ensued in the following months. "Motation" was published in July 1965, predating Halprin's resignation from BART by the end of November 1966. See Letters, Sue Yung Li to Ray Smith, 21 September 1964 and 2 November 1964, Folder "Motation - article," call no. 014.I.A.6091, Halprin Collection. In fact, in an early outline for his article in *Progressive Architecture*, Halprin proposed to include an illustration of a "design of a 4-mile run in a rapid transit system." Letter and Movement Notation Outline, Sue Yung Li to Ray Smith, 2 November 1964, Folder "Motation - article," call no. 014.I.A.6091, Halprin Collection. Although this was ultimately never included, it is interesting to note that Halprin was at the time confident enough in his BART score to consider publishing it in a major journal of architecture and planning.

[630] Lawrence Halprin, "Motation," *Progressive Architecture* 46 no. 7 (July 1965): 126-133.

article, he wrote: "In a world intensely involved in the development of motion through space, little has been done to express it graphically. Movement is all around us; mobility has permeated not only our engineering but our arts as well."[631] This mobility was not only evidenced concretely and physically by the rapid construction of highways and transportation systems, but it was also reflected metaphorically in the rejection of traditional, fixed, and static means of representation in new fields such as kinetic art and electronic music. Instead of forcing the traditional tools of architecture into consonance with this new and contemporary urge against stasis, architects, similarly, had to find their own new means of representation better suited to movement in space and time. Halprin insisted: "A new system should be able to focus primarily on movement, and only secondarily on the environment," particularly because, as he believed, "movement and the complex interrelations which it generates are an essential part of the life of a city."[632]

In his article, Halprin not only explained the mechanics of his Motation system, but also its motivations, objectives and precedents, some of which had appeared in *Cities* in 1963. As Halprin explained, the existing systems of architectural representation were limited because they described only fixed surroundings and provided no means for capturing activity occurring within urban space. He wrote: "This limitation of symbols affects our results. Since we have no techniques for describing the activity that occurs within spaces or within buildings, we cannot adequately plan for it, and the activity comes, in a sense, as a by-product after the fact."[633] Halprin urged designers to consider

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[631] Halprin, "Motation," 126.

[632] Halprin, "Motation," 126.

[633] Halprin, "Motation," 126.

movement as a more integral force in planning decisions. Movement and its effects were such a central aspect of the life of a city, Halprin explained, that designers should have the option of beginning with movement before anything else: “Only after programming the movement and graphically expressing it, should the environment – an envelope within which movement takes place – be designed. The environment exists for the purpose of movement.”[634]

The reciprocal relationship posited by Halprin between the individual and the environment provided the conceptual basis for his notation system. As man moved through the environment, the environment also moved around man: “In terms of the individual whose only true continuity is his own awareness, it can be said, with all psychological justice, that the environment moves.”[635] Accordingly, Motation recorded the point of view of the individual surrounded by an environment in motion and was, moreover, designed to be read from the bottom of the page upward. As Halprin explained, “vertical usage graphically conforms to the experience of moving through an environment. As we walk, ride, or drive, we carry the notion of looking ‘ahead.’ Psychologically we orient upward rather than downward.” The bottom-up orientation also allowed for continuity of representation of visual experience, as multiple sheets could be adjoined end-to-end.[636]

The system used a basic alphabet of 26 symbols built from the dot, arc, and line. (fig. 5.3) These symbols represented mobile elements such as other people, cars, and

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[634] Halprin, “Motation,” 126.

[635] Halprin, “Motation,” 128.

[636] Halprin, “Motation,” 129.

clouds; immobile objects such as walls, buildings, and fountains; and landscape features, including hills, mountains, and trees. Its two-track framework indicated qualities of three dimensions as well as speed and distance traveled. (fig. 5.4) The left track described the path taken through the environment in plan view. The bottom-most frame, called the "key frame," traced the entire path of travel, with close-ups of successive portions of the journey depicted in the frames above. These frames signaled turns as well as the motion of the observer relative to other physical elements. The right track in the two-track framework consisted of successive perspective views from pedestrian eye level. Each perspective view spanned 180 degrees and was split down the middle into two 90 degree segments, to the left and right. (fig. 5.5) The left and right tracks were keyed to one another through their horizontal relationship – both were read from the bottom of the page upward at the same speed – as well as through parallel distance and time lines. (fig. 5.6) Along the distance line, the units were evenly spaced, with an area where rise and fall of surface could be noted. Along the time line, dots were irregularly spaced to indicate change of speed when read in relation to distance covered. Just as in any architectural drawing, a title block at the bottom of the page listed essential information such as means of movement (i.e. foot, car, etc.), total time and distance, and units of measure.[637]

For the purposes of illustration and to allow the reader to follow along, Halprin included snapshots taken along the journey that could be read in conjunction with the notation (fig. 5.7). In fact, the article contained three examples of Motation scores, accompanied by snapshots, to illustrate how the notation functioned, one of movement by

[637] Halprin, "Motation," 128-130.

foot through the campus of UC Berkeley, another a four-mile freeway trip by car, and a third showing a dance sequence in space. A fourth notational system, entitled "Mysterious Journey," was deliberately left without snapshots, a hook for the reader to become involved and decipher the journey on his own. Halprin even included his own address and asked readers to mail in their final descriptions and guesses as to the location of the mystery sequence being represented.[638]

In structure and framework, "Motation" had marked differences from his earlier notational scores. The essential intention behind the system – to notate the experience of an individual in motion through an urban fabric – and the methodology of synchronizing the system over the progression of time and distance remained the same, but the directional orientation and visual relationship between horizontal and vertical tracks were revised. The orientation of his earliest scores required that the notation be decoded from left to right, abstracting the experience of movement through the environment to a process of parsing symbols and translating their meaning – akin to the act of reading (see Chapter 3). In the new orientation, the notation progressed from the bottom of the page upward, aligning the centerline of movement with the centerline of the reader's own vertical self image. As the notation progressed forward in time and distance, the reader's eyes progressed similarly upward. Thus, the translation of the experience of motion became a more intuitive act as it paralleled the reader's own frame of reference. As such, Halprin's reorientation had the seminal impact of shifting his notation from a record that could only be read to one that came closer to approximating experience. It became less a language and more a process of recording experience, albeit one that required time and

[638] Halprin, "Motation," 130.

effort to understand.[639]

Similarly, the relationship between the vertical and horizontal tracks in "Motation" was stronger than in his earliest notations. In the latter, both tracks progressed along their own continuum; although keyed to the same time scale, they were formalistically separated and the experiences captured in each difficult to intuitively synchronize.[640] In the 1965 article, several vertical frames corresponded to each horizontal frame, breaking the portions of the journey into digestible and discrete segments. The horizontal track became more map-like, functioning as a device to locate the reader within the larger environment being traversed while the vertical frames offered snapshots from the perspective of the individual on the ground. Although the two tracks were still read separately, the experiences they represented could be read together more easily. Furthermore, Halprin had, by now, standardized the structure of his Motation scores with a framework that allowed the key frame to stand in much closer relationship to the rest of the notation. Whereas prior scores did not always contain a key frame,[641] the newly standardized Motation form printed in the article of 1965 included a key frame block in the bottom left hand corner that emphasized the coordination between the

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[639] Although Halprin never referred to parallel discourse in literary criticism on structuralism, it would be interesting to analyze the process of "reading" required by Motation from a structuralist point of view, particularly the concept attempting to represent the nonlinear experience of space through the use of a decidedly linear diagram.

[640] In other words, we do not experience two separate worlds of horizontal and vertical, and any system that divorces the two must have an intuitive method of synchronizing the two, which Halprin's early scores lacked.

[641] Although the Two-Minute Score and Capitol Towers Score included a key/main frame that located the reader in the larger score, two of Halprin's largest scores – the SF Score and BART Score – did not have a true key frame but rather an overall map of the journey that was connected to the score through letters (as in the former) or mile markers (as in the latter). See Chapter 3.

horizontal and vertical tracks from the very beginning.[642] Another feature of the standardized Motation forms was a list of 26 Motation symbols, an arbitrary number most likely chosen for its correspondence with the quantity of symbols in the English alphabet.[643] While many of these revisions to his movement notation likely emerged from Halprin's desire to standardize and simplify his system, a final Berkeley graduate seminar he taught on movement notation in the fall of 1964 appears to have given him the opportunity to reevaluate his notation system and allowed him time to focus on his notation and access to critical minds in an arena far from his own professional practice.[644]

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[642] As Halprin intended the Motation to become a standard tool in architectural practice, the development and use of a standardized form was a requisite step. Indeed, Halprin's office files on Motation in the Halprin Archive contain photocopied hand-drawn Motation forms that were likely a prototype (see Folder "Motation System; office file, 1962," call no. 014.I.A.1628, Halprin Collection). The files also contain pre-printed tablets of blank Motation forms in their final version, some of which bear evidence of being used by office staff (see Folder "Motation," call no. 014.I.A.5132, Halprin Collection).

[643] Based on the two pages of "Additional Motation Symbols" included in the original submission of materials to *Progressive Architecture* in January of 1965, the 26 symbols chosen for publication were taken from a pool of more than sixty, which included eight additional for "moving things," sixteen more for "landscape," fourteen extra for "structure" and so on. Some of the additional symbols even indicated unquantifiable sensory experience such as odors and sounds. Halprin indicated that more symbols could be produced given the circumstances and need. See Lawrence Halprin & Associates, "Additional Motation Symbols," c. early 1965, Folder "Motation," call no. 014.I.A.5132, Halprin Collection.

[644] Halprin significantly revised his movement notation system over the course of his active documented correspondence with *P/A* between September 1964 and April 1965 (see Folder "Motation - article," call no. 014.I.A.6091, Halprin Collection). Fortuitously timed with *P/A*'s invitation to prepare an article on his notation, Halprin chose to hold his Berkeley seminar on movement notation. Lawrence Halprin, "Notes on a Notation System – U. C. Berkeley Senior Graduate Seminar – November-December 1964," in Halprin, *Notebooks*, 95-104. In his class notes, Halprin sketched out the terminology and framework of his notation system and clarified its philosophy. He diagrammed the ways in which urban movement had changed from medieval to Renaissance to modern times and began to develop a more complete and comprehensive vocabulary of symbols, many of which appeared in "Motation" the following year. Although it is unclear whether Halprin shared these notes with the students or used them to organize his own thoughts for the seminar, they reflect his intention to make significant revisions. The seminar itself appears to have been devoted to reevaluation and critical improvement of the notation. Each of six student reports, written at the end of the semester, critically analyzed Halprin's notation system, pointing out flaws and suggesting alternate directions to pursue. Two of these reports made reference to trial environments in which they tested the notation system, including two that appeared in "Motation": Berkeley's student union plaza and a section of the San Francisco freeway. Although the absence of images in the reports makes it impossible to determine whether the cited environments followed the same paths transcribed in the article, the consonance evidences the significant crossover between the class and the article. Anne Marie Baggio, "Movement and Environment," n.d.; and Magne Bruun, "The Movement Notation System: An Attempt of Evaluation," Fall 1964; both located in Folder "Movement Notation Class," call no. 014.I.A.2647, Halprin

In the conclusion to the article, Halprin noted that his Motation system should not be read as a substitute for the architect's standard tools, but as an addition, functioning as "abstract representations of three-dimensional visual experience – a new symbology." Halprin asserted that his Motation could be used to describe existing conditions as well as a tool to design for the experience of movement through space. He wrote: "As a musical score can describe a piece of music that then can either be heard in the mind's ear or actually played, so Motation can describe motion through space that can either be seen through the mind's eye or moved through in actuality. Motation is a tool for choreography as much as description; choreography in the broadest sense – meaning design for movement."[645] From very early in his career, Halprin had extolled a concept of choreography that was embedded in the classical traditions, as evidenced by his landscaping and written work on private gardens during the 1950s (see Chapter 3).[646] Thus, in his article "Motation," Halprin sought to justify the importance of his own

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Collection, as well as the following in the same folder: T. A. Brown, "Lawrence Halprin Class in Movement Notation," January 1965; Jennifer Ffennell, "Movement Notation: An Evaluation," 14 January 1965; J. Lyle, "It would seem that the space notation system...," n.d.; author unknown, "The Creation of a New Design Tool," n.d.. The relevance of the students' comments suggests that they were intensively involved in the process of critically reevaluating the notation. Three students separately urged Halprin to standardize the notation or the symbols; one in particular highlighted the need for more expressive symbols. "The Creation of a New Design Tool," Bruun report and Lyle report. Others questioned his stated desire to be as objective as possible, arguing that such a goal was impossible to achieve given the subjectivity of the recorders and the existence of infinite other elements that were either uncontrollable or unrecordable such as minute variations in climate, lighting conditions, etc. (see Brown and Lyle reports). Several reports agreed on the fact that the notation was most valuable when recording linear journeys taken at high speeds, such as their freeway trip, arguing that the notation was more successful in recording larger and more general impressions rather than attempting to capture small minute details. See reports by Ffennell, Bruun, and unauthored report titled "The Creation of a New Design Tool." One author even recommended that Halprin eliminate the side views (a standby of his old notation system) and focus instead on the straight-ahead views (the approach taken in his new system; see Ffennell report). Although it is tempting to see a direct correlation, it is difficult to confirm the extent to which the students' evaluations directly influenced the evolution of Halprin's notation system.

[645] Halprin, "Motation," 130.

[646] Halprin began thinking about the concept of choreography early in his career (see Chapter 3).

notation by connecting it to what he saw as parallel developments in the field of dance. As Halprin explained, "in the dance itself–the purest form of movement–choreographers have been working for centuries to devise systems with which to record their movements. The most recent and complete system to date is Labanotation…. [which] is detailed in its recording of gesture; it is a fine tool for conveying precise movements of arms, legs, step patterns, and attitudes."[647] It is significant that, in his article "Motation," Halprin highlighted the potential of Labanotation, which was the first dance notation to describe the movements of the dance from the perspective of the dancer (see Chapter 3). As he wrote, "Labanotation is, in certain important ways, parallel to our system in its use of vertical staves."[648] Indeed, its structure and focus on the perspective of the person experiencing the movement – in Laban's case, the dancer – resonated with Halprin's larger project of charting the movement of the individual through the urban fabric.

Although Halprin's references to dance notation offered colorful examples to the reader of similar developments in the field of choreographed movement, it is important to note that the intentions and parameters of the two notations were significantly different. In dance notation, the environment for movement was not notated, but rather the specific movements of the dancer's body and limbs. Halprin's notation, on the other hand, did not record specific movements of the individual, but rather recorded motion in relation to the larger environment, or more specifically, noted the changing spatial characteristics of the environment as the individual moved through it. This act of moving through the environment could never be scripted in the same way that a dancer's movement could,

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[647] Halprin, "Motation," 128.

[648] Halprin, "Motation," 128.

for the simple reason that an individual's movement was not circumscribed for stage performance. Halprin failed, moreover, to clarify the criteria through which the individual's route through the environment was selected for scoring. In other words, was the notated path selected for its choreographic potential – even if it was not the most direct line through the environment – or was a straight-line path chosen and its choreographic potential assessed through the use of the notation system? It is clear that the experience on a specific path from point A to point B through the environment would have a notational score that was significantly different from any other path between the same two points. Thus, it would be difficult to assess whether the Motation score for a notated environment looked as it did because a particularly scenic path had been chosen, or because the environment itself invited scenic wandering and visual engagement by design. In his rush to justify Motation by citing the precedent of dance notation, Halprin seems to have glossed over the enormous differences in approach between the two systems and failed, moreover, to clarify exactly how his notation was, ultimately, distinct from dance notation in both intent and application.

In "Motation," Halprin did not just make connections to dance, but also to music, seeking to embed his notation within the larger tradition of avant-garde performance on the whole: "In electronic music… sound is developed, and the resultant tones cannot be scheduled in reference to any fixed system of instruments or notes. The need for a new notation arises out of the inability of the traditional system to express new concepts."[649] His text in this section was illustrated by a page of Morton Subotnick's score for "PLAY! no. 1," a mixed media piece written with the aid of a novel new notational system and

[649] Halprin, "Motation," 126.

performed in 1964 at the San Francisco Tape Music Center. (fig. 5.8) In this way, Halprin justified the creation of a new notation system in architecture, likening the tones that could not be captured by traditional music notation to the new conditions of speed and movement that, likewise, could not be notated in traditional architectural drawings. As Halprin explained, if Subotnick could create a new system for music, then Halprin could create one for architecture.[650]

By describing Subotnick's piece and including a page of his score in "Motation," Halprin not only sought to justify the development of his own notation system, he was also demonstrating his connections to the Bay Area's counterculture performance art scene. His wife Ann's avant-garde dance work in the 1950s and early 1960s (see Chapter 3) brought both of them into contact with many of the foremost avant-garde musicians and dancers of the time, such as Subotnick and composer Ramon Sender, both members of the San Francisco Tape Music Center. The Center had been founded in 1962 by Subotnick and Sender to provide studio space for tape music composers of the Bay Area to create electronic music in a venue that was unaffiliated with either academic institutions or the commercial music industry.[651] Although the Center's composers had studied and been trained in the classical tradition, all were compelled and attracted by the new medium of recordable audiotape. The technology of the time allowed for the manipulation of audiotape through processes of cutting, splicing, overlay, and manual

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[650] Halprin, "Motation," 128. Halprin had been interested in comparing his own notation to Subotnick's as early as the previous November of 1964. See Letter and Movement Notation Outline, Sue Yung Li (on behalf of Lawrence Halprin) to Ray Smith (editor, *Progressive Architecture*), 2 November 1964, Folder "Motation - article," call no. 014.I.A.6091, Halprin Collection.

[651] It was an independent nonprofit enterprise, with a larger mission to open the experience of electronic music to a wider public audience and to create a place where composers could explore their dedication to new music as part of a more inclusive process of artistic collaboration. Ramon Sender, "Overview of the Tape Music Center's Goals," in Bernstein, *San Francisco Tape Music Center*, 47-49.

speed control. Experimentation with magnetic tape was part of a larger movement toward electronic music in the twentieth century that was dedicated to expanding the range of sounds available to the musical repertoire, exploring the possibilities of recording ambient sound, and pushing the boundaries of experimentation with everyday objects and noises.[652] The Center was conceptualized as a collaborative endeavor that would promote communication between artistic media and between the fields of music, film, and dance. Despite being called a Tape Music Center, performances almost always combined the aural and the visual, using combinations of recorded electronic sounds, live instrumental sounds, and choreographed movements for the instrumentalists. These performances were often combined with visual displays by artists who collaborated with the Center, such as Elias Romero and Tony Martin, and usually consisted of a combination of liquid light projection, film (either appropriated and manipulated or shot for the piece), and hand-painted glass slides.[653] The material was projected live in concert with the rest of the performance and was considered an indispensable part of the total work. This approach to performance has been likened to the concept of total theater, with historians of electronic music writing of the influence of Laszlo Moholy-Nagy's 1924 design for a theater of totality and its amalgam of art forms, including lighting and visual display.[654] In 1963, Sender invited Ann to lease space in the Center's building on

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[652] During the five years in which it was open, the Center was home to an array of experimental music and multi-media, art, and dance performances. Its members, featured composers, and performers collaborated with many of the other avant-garde, experimental and countercultural arts establishments of the Bay Area. See Bernstein, *Tape Music Center*.

[653] Bernstein, *Tape Music Center*, 142-143, 155.

[654] Bernstein, *Tape Music Center*, 20, 23. Bernstein notes to influence of Moholy-Nagy's design on a generation of light artists who envisioned their pieces as part of a total performance or collaborative endeavor with the performing arts.

Divisadero Street for her San Francisco Dancer's Workshop and she readily accepted.[655] Over the years, Ann performed to music composed by other members of the Center, such as Pauline Oliveros, and collaborated with the Center's visual director, artist Tony Martin, on sculptural installations and stage sets.[656]

The excerpt included by Halprin in "Motation" of Subotnick's 1964 score for "Play! no. 1" was a collaborative total theater piece that embodied many of the Center's organizing principals.[657] Subotnick's piece had been commissioned by the West Coast Woodwind Quintet and was scored not only for a tape recorder, but also for a piano and a woodwind quintet of flute, oboe, clarinet, horn, and bassoon (fig. 5.9). The piece was performed live by the Quintet in the October 12th-14th concert in 1964 along with

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655 Bernstein, *Tape Music Center*, 225.

656 Bernstein, *Tape Music Center*, 83, 140. The core members of the Center were part of an informal group of composers who came from graduate programs in music and composition in the Bay Area. Bernstein, *Tape Music Center*, 80. Between 1960 and 1966 Ann made eleven dances to scores by Luciano Berio, Morton Subotnick, Folke Rabe, Pauline Oliveros, La Monte Young and Terry Riley. Bernstein, *Tape Music Center*, 225. The Center was dedicated to showcasing compositions of avant-garde composers such as John Cage, Luciano Berio, and Karlheinz Stockhausen, as well as the works of area composers. This showcasing of avant-garde composers began with the earliest SONICS concert series (1961-2) organized by Sender in 1961, a year before the Tape Music Center was officially named and opened. At the time, Sender had set up a basic studio in the attic of the San Francisco Conservatory that served as the unofficial locus of experimental music and composition. The Center was officially founded later in 1962 by Sender and Subotnick and located in a condemned Victorian house on Jones Street in San Francisco. Bernstein, *Tape Music Center*, 10-14. Terry Riley and La Monte Young, both studying at Berkeley and both active participants in San Francisco's thriving countercultural and experimental music scene, often collaborated with the Center's members and performed in the Center's concert series. Bernstein, *Tape Music Center*, 1-2, 9-11.

657 Although Subotnick's piece was one of the more famous performed at the Center, this combination of live acoustic performance and tape music was not uncommon. The first piece of this nature was actually performed during the SONICS series organized by Sender for the 1961-62 season, which immediately preceded the official opening of the Center. Composed by Bruno Maderna, it was part of a concert that featured three composers – including Luciano Berio and Luigi Nono – from the Studio di fonologia musicale in Milan. The piece, from 1961, was called "Serenata à 3" and was scored music for flute, marimba, and tape. This genre of live acoustic and tape media composition, previously pioneered by Maderna in 1952 with a work titled "Musica su due dimensioni," later became a focus of experimentation at the Tape Music Center. Bernstein, *Tape Music Center*, 12. Indeed, the genre was readily embraced by Subotnick, who was an experienced classical clarinetist, conductor, and instrumental composer.

audiotape playback and live visual liquid light projection by Martin.[658] The piece was described by Subotnick as "one of the early theater pieces" and was intended, by his own admission, to be a "satire [that dealt] with all the rituals of performance."[659] The composition has been described my musical historian David Bernstein as combining "a vast repertoire of instrumental gestures with precise indications for extramusical movements by the performers. Its theatrical component presented a humorous look at performing, the players shouting, counting, and exchanging accusatory glances amid virtuoso flurries of instrumental lines."[660] (fig. 5.10) The score itself is vaguely similar to a traditional conductor's score and included a track at the bottom of the page indicating use of magnetic tape playback.[661] Aside from the fact that the score begins at the left side of the page, the similarities with a traditional musical score end there. Indeed, the score is far from conventional, combining textual indications for direction and duration of movement with a novel system of recording pitch, tone, and duration that is not based on the traditional musical scale.

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[658] For the piece, Martin shot roughly ten minutes of film on a Bolex 16mm movie camera, consisting of clips of Subotnick entering and exiting various doorways throughout the city of San Francisco. After minimal splicing, Martin's film was ready and was simply played alongside the performance. There was not, however, intended to be a one-to-one correspondence between the film and the tape music or live performance. Although Martin had usually heard Subotnick's tape composition before composing the visual display, he did not consider his art to be either an illustration or an accompaniment to the music; it was an equal part in its own right. Bernstein, *Tape Music Center*, 155. Unfortunately, the original performance was never recorded. According to Martin, very few, if any, of the pieces performed at the Tape Music Center were captured on film. This is likely due to the fact that the performances were conceived as total theater, with the focus on the experience of the moment rather than on documentation for later. Bernstein, *Tape Music Center*, 156. See also page 276 of the chronology appendix to the Bernstein book for concert dates for *Play! no. 1*.

[659] Bernstein, *Tape Music Center*, 29, 129-130.

[660] Bernstein, *Tape Music Center*, 28.

[661] This particular page is the subject of this analysis as the published version of the work was modified and does not align with the original score written by Subotnick. See Morton Subotnick, *Play no. 1* for woodwind quintet, piano, tape and film, 1964 (New York: MCA Music, 1971).

Subotnick's piece, a collaborative endeavor involving musicians, movement, film, and tape music, sought to break down the traditional interart barriers of the academy. Created as an outright satire of the traditional rituals of music, it rejected the seriousness with which musical performance was usually invested, instead poking fun at the classical music academy and industry. As such, it not only attempted to dissolve the traditional barriers between the arts, but also loosened – through the mediative effects of humor– the traditional structure separating performer and audience typically associated with the serious enjoyment of classical music. As such, Halprin may have seen it as a fitting precedent not only for his notation system, but moreover for his approach to landscape design: just as Subotnick broke the barriers between performer and audience, Halprin hoped to break the barriers between the individual and the environment which he believed were created through static urban master planning and design. However, there was little truly in common between Subotnick's system of notation – which varied from one page of the score to the next and was neither structured nor standardized – and Motation, which Halprin hoped to position as a standardized tool that could be easily used by everyone. In this way, the congruence Halprin posited between his own work and Subotnick's was paradoxical and did little to advance his agenda of justifying his notation system through direct connections to avant-garde scoring in music.

It is interesting to note that Ann's collaborations with the musicians of the Bay Area electronic music scene yielded innovative and idiosyncratic systems of recording choreography, in which Halprin himself occasionally became involved. Both Halprin and Ann were searching for new ways of recording experience and developing scores, Halprin in the experience of landscape and Ann in the process of choreographing pieces for dance. Indeed, the influence on Halprin of Ann's work in the field of experimental dance was an undeniable one, as has been measured in several biographies on the Halprins.[662] Over the course of their lives together, they developed a synergistic relationship, broadening their understanding of the experience of space – Halprin through landscape and Ann through dance. (fig. 5.11)

The choreography developed by Ann in collaboration with Morton Subotnick in *Parades and Changes* in 1965, for example, employed a novel new system of notation that enabled Ann to experiment with non-narrative sequences and the possibilities of breaking the cause and effect relationship through a purposeful juxtaposition of unrelated events. In this dance, various sets and combinations of mundane tasks were performed by the dancers and repeated over and over again so that the everyday movement required to accomplish the task became the focus for the audience. This repetition, along with the intentional disjunction between events, functioned to divest each piece of any scored or profound meaning, opening the interpretation of the work to the individual members of the audience. *Parades and Changes* was enabled by Subotnick's scoring method, based on the concept of the cell block, which allowed each performance element to stand independently of the others. (fig. 5.12) The system, pioneered by Subotnick, was based on a system of musical scoring he had developed at the Tape Music Center for controlling and relating all of the various aspects of a single piece.[663] Each of the four major performance elements – choreography, music/sound, lighting, and sculpture – had

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[662] See *Lawrence Halprin: Changing Places* (San Francisco: San Francisco Museum of Modern Art, 1986); Janice Ross, *Ann Halprin: Experience as Dance* (Berkeley: University of California Press, 2007); and Libby Worth and Helen Poynor, *Ann Halprin* (London: Routledge, 2004).

[663] Ross, *Experience as Dance*, 184.

its own set of cell blocks. Each block represented one particular action or event that was purposely unrelated to the others. For example, the choreography blocks included the following events: stomp dance, dress and undress, paper-tearing, costume parade, and move with scaffold. The music blocks included Bach's Brandenberg Concerto, percussive rhythmic pattern, electronic sound, and live music from a horn. Each performance element had between six and twelve cell blocks of its own. The blocks were developed so that they could be shuffled around and performed in any order relative to both the other blocks in the same element and the blocks of the other elements.[664] As a result, no two performances were alike, even those that were performed in the same theater.

The unique scoring system developed for *Parades and Changes* is notable because Ann was working with Subotnick's notation system at the same time that Halprin was finalizing the content and framework of his article on "Motation" for *Progressive Architecture*. Moreover, shortly after the article was published, Halprin traveled with Ann and her Dancer's Workshop to Stockholm for a performance of *Parades and Changes* for which Halprin himself synthesized and combined the master score on site. When the piece was performed in Stockholm, the debate over how to plan the transitions between the randomly ordered and chosen portions of the dance was often rather complex.[665] Although Halprin may not have contributed to the planning of these transitions, he did in fact work with their scoring. Notes taken by Halprin during this trip to Sweden for the Stockholm performance show drawings representing how one block

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[664] Halprin, *RSVP Cycles*, 36.

[665] "Yvonne Rainer Interviews Ann Halprin," *Tulane Drama Review* 10 no. 2 (Winter 1965): 160-161.

would transition into the next. (fig. 5.13) In these drawings, each chosen cell block was represented by a square or rectangle roughly equivalent to the amount of time it was required to take. Halprin overlapped and shifted these squares in the given sequence to show how much time it would take for the dancers to transition from the first block to the second and all the way up to the sixth and final block.[666]

Ann's work in *Parades and Changes* has parallels with the choreographic concept of Halprin's Seattle Center fountain (see Chapter 3). Both were choreographed so that no two performances were alike. In Ann's case, this was achieved through the use of Subotnick's pioneering cell-block concept, which allowed portions of the dance to be rearranged randomly, yielding performances that were not only ordered differently, but presented new material in the form of the transitions that the dancers were forced to develop to tie together the disparate elements. In Halprin's case, he was similarly able to ensure that no two fountain performances were alike by modifying fountain's structure and hardware. However, the fountain's effects were still scored, imbuing each successive "performance" of the fountain with a constant structure with repetition and rhythm.

Halprin's involvement and awareness of the counterculture music and dance scene in San Francisco thus provided him with a means to legitimize his own notation system. Many of the works of the San Francisco avant-garde were associated with a movement that was broadly defined by Michael Kirby as "The New Theatre" in an article of 1965, which was published the same year as Halprin's "Motation."[667] "The New Theater" combined the fields of music, dance, drama, and visual art into a new genre of

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[666] "Scoring System for 'Parades & Changes' Stockholm Sept 5," in Halprin, *Notebooks*, 143. This excerpted page from his notebooks is dated to 1965.

[667] See Michael Kirby, "The New Theatre," *Tulane Drama Review* 10 no. 2 (Winter 1965): 23-43.

performance, otherwise known as the Happening.[668] Kirby framed many of the concepts of the New Theatre as an outgrowth of the emergence of Happenings and examined many of the artists, composers, dancers, and performers who were contributing to the fertile conceptual soil in which the Happening was taking root. Indeed, the issue included an interview with Ann Halprin, in which she described her work in *Five-Legged Stool* and *Parades and Changes*, as well as the work of La Monte Young, Ramon Sender, Tony Martin, and Ken Dewey, figures intimately connected with the evolution of San Francisco Tape Music Center and the Bay Area's experimental music scene.

Kirby noted in particular the emergence of what he called indeterminate scoring, a process whereby the composer specified set actions or events but provided the performer with several choices, either in the manner or order of completion.[669] Other key concepts of the New Theatre included "the tendency to reduce or eliminate the traditionally strong divisions of drama, dance, opera," and the related attempts to "'break down' the 'barrier' between presentation and spectator and to make the passive viewer a more active participator."[670] These concepts were, for Kirby, rooted in the work of John Cage, who was seen as the inspiration for much of the experimental work and conceptual approach

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[668] This latter term emerged in 1959 in the context of a performance titled *18 Happenings in 6 Parts* orchestrated by artist Allan Kaprow at the Reuben Gallery in New York City. Although Kaprow never intended the term Happening to stand for a larger movement, it became associated in the public's mind with all performances of this kind, as well as many others that did not in fact achieve the same intended tension between scored action and spontaneous occurrence. See Kirby, "The New Theatre," 29. The concept of the Happening, initiated by Kaprow's work, continued to develop in the art scene in New York, specifically in the work of artists associated with the Reuben Gallery: Red Grooms, Robert Whitman, Jim Dine, Claes Oldenberg, and of course, Kaprow himself. See Michael Kirby, *Happenings: An Illustrated Anthology* (New York: E.P. Dutton & Co, Inc., 1966), 10.

[669] Kirby, "New Theatre," 30, 33-35.

[670] Kirby, "New Theatre," 38 and 40.

of the experimental performance scene.[671] Cage broke down the traditional system of musical representation: while classical music notation allowed for fixed note scales played by immobile performers on standard instruments, Cage sought to incorporate a multitude of other factors, from the movement of the performers to scoring for instruments to be played in non-traditional ways or through hardware modifications. His work can be considered as much theater as music, with instructions given not only for aural events but also visual and kinesthetic. In a certain sense, Cage made it possible to think outside the proverbial box, opening up new avenues for experimentation in the notation of art and experience.

In "Motation," Halprin pointed to Cage's work as a precedent, writing: "In many of the newer works, such as those of John Cage, an essential element in the presentation is the movement of the performers, who change position on stage in a kind of choreographed processional, moving about from instrument to instrument while they make their sounds. Dance has invaded the environment of music."[672] However, although Cage's performers were often instructed to move, his work rarely ever scored for any so-called choreographed processional. Cage vehemently eschewed the concept of purpose or intention in the writing and performance of his pieces and preferred to use indeterminate or chance-based structures to score his pieces. Rather than using a particular, predetermined notation structure, like Halprin, Cage's notation was an outgrowth of whatever method he had used to compose a given piece. Thus, Halprin's inclusion of Cage in "Motation" was more of a legitimizing act and less of an example of

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[671] Kirby, "New Theatre," 24-26, 27.

[672] Halprin, "Motation," 128.

true correspondence in intention, approach, or even finished product. Nevertheless, Halprin's inclusion of dance and music in "Motation" is, perhaps, emblematic of the larger attempt noted by Kirby in the counterculture arts scene to break down the boundaries between media, art forms, and disciplines and contribute to a more collaborative endeavor. Indeed, within three years of its original publication in *P/A*, "Motation" was published in several journals, including *Impulse: Annual of Contemporary Dance*. In the "author's note" to the article, Halprin wrote that his article was intended "to contribute to the on-going effort to bring a useful graphic system to kinetic environments whether on the street or on the stage."[673] Despite the fact that the choreography of dance and the movement of the individual through the environment were significantly different acts, Halprin's continued insistence on the connection between the two reveals his attempts to situate his notation system within the larger avant-garde music, dance, and "New Theatre" scene of the 1960s and thereby imbue it with a legitimacy that it had not yet achieved.

Correspondence between Thiel, Halprin, and the MIT authors

Although the three system of notation developed by the MIT authors, Lawrence Halprin, and Philip Thiel in the early 1960s had significant similarities – more so in

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[673] Lawrence Halprin, "Motation," *Impulse: Annual of Contemporary Dance* (1966): 26. Folder "Impulse," call no. 014.I.B.2949, Halprin Collection. That same year, an excerpt from Halprin's Berkeley score was published in *Kaiser Aluminum News* in an article calling for an application of advanced electronic technology to urban traffic problems. Halprin's Motation was referenced as an example of how movement could be recorded and, therefore, also incorporated into traffic engineering to create a more efficient system of transportation (see "Ballet of the clockwork dinosaurs," *Kaiser Aluminum News* no. 3 (1966): 7-17, Folder "Motation," call no. 014.I.B.2974, Halprin Collection). Two years later, in 1968, the entire article was translated and published in the French journal *Architecture mouvement continuité*, including all illustrations and images (see Lawrence Halprin, "Motation," *Architecture mouvement continuité* no. 168 (1968): 6-13, Folder "Motation," call no. 014.I.B.2974, Halprin Collection).

intention rather than visual form – it seems clear that there was relatively little cooperation and correspondence between them on the subject of notation. There were several seeming connections between the authors – Thiel had worked with Lynch in 1956; Appleyard and Halprin both taught classes on notation in fall of 1962, albeit on opposite coasts; Halprin joined the faculty at Berkeley shortly after Thiel left it – however, it seems clear that each notation was developed in relative isolation from the others. Nevertheless, Thiel at least attempted to establish dialogues with both Lynch and Halprin in the mid- to late-1960s on the subject of notation and tried to thus draw together their three systems of notation.

In July of 1964, Thiel circulated a working paper on "The Tourist and the Habitue" that analyzed how familiarity with a given landscape fundamentally altered the way meanings and environmental cues were perceived.[674] Kevin Lynch was among the colleagues to whom Thiel sent his paper, as well as others such as anthropologist Edward T. Hall and scientist Albert Eide Parr.[675] Lynch responded positively to Thiel's division between the two types and acknowledged that for environmental designers, it was imperative to design for both types at the same time.[676] Lynch had, in fact, noted this distinction in *The View from the Road*, where he wrote that the tourist and the daily commuter would have very different relationships and reactions to the highway experience and that it was necessary to design the road with an awareness of the full

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[674] Philip Thiel, "The Tourist and the Habitue: two polar modes of environmental experience, with some notes on an 'Experience Cube,' July 1964," Box A, Folder "UP [User-Participant] Working File," Thiel MSS.

[675] Letter, Kevin Lynch to Philip Thiel, 19 August [1964]; Letter, Albert Eide Part to Philip Thiel, 29 August 1964; and Letter, Edward T. Hall to Philip Thiel, 2 November 1964; all located in Box A, Folder "UP [User-Participant] Working File," Thiel MSS.

[676] Letter, Lynch to Thiel, 19 August [1964], 1.

range of its eventual users.[677] The MIT authors wrote of their indebtedness to Thiel's early work in their book, writing that their proposal for a notation system "borrows heavily from the previous work of Philip Thiel, who has worked on this question in depth."[678] Although the exact degree to which the MIT authors leaned on Thiel's work is difficult to determine, certain elements did seem to emerge directly from his work, such as the MIT authors' use of "O" for space that was strongly defined and "X" for one that was ill-defined, which corresponds directly to Thiel's earlier description of spatial enclosure in his "anatomy of space" of 1959 (see Chapter 2).

Thiel was certainly interested in the notation developed in *The View from the Road* and was familiar with Lynch and Kepes's work on The Perceptual Form of the City, as he had worked with them for a summer.[679] Indeed, Lynch and Thiel maintained contact even decades after Thiel had left MIT for the west coast.[680] Despite these connections, it does not appear that Thiel and Lynch collaborated on developing a

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[677] Appleyard, Lynch and Myer, *View from the Road*, 4.

[678] Appleyard, Lynch and Myer, *View from the Road,* 21. In the footnotes to the text, they cited many of Thiel's articles, including two of his unpublished working papers of 1959-1960 as well as his articles of 1961 in *Town Planning Review* and *Landscape*.

[679] Not only had Thiel participated in the PFoC study, but he also owned a bound book (now in the Thiel MSS) titled "Form of the City" that contained copies of Lynch and Kepes's research papers from The Perceptual Form of the City study, including "A Framework for the Form of City Study and Some Topics of Interest," "The Perceptual Form of the City: Progress Report and Plan for Future Studies, June 1955," "Memo to Kevin Lynch from Gyorgy Kepes, Morphological Aspect of the City, 14 October 1955," "Some Childhood Memories of the City," and "Recommended References on the Form of the City, February, 1955." See Kevin Lynch and Gyorgy Kepes, "Form of the City," Box F, Folder "[Kevin Lynch and Gyorgy Kepes, The Perceptual Form of the City]," Thiel MSS.

[680] Thiel also owned an original edition of *The View from the Road* (now in the Thiel MSS) that he had studied in great detail. The pages of the book are filled with Thiel's hand-written notes and, tucked into the inside cover, is a notational script written in Thiel's system that seems to replicate the 12-minute sequence along the Northeast Expressway that is described in *The View from the Road*. Unfortunately, the notation is neither titled nor dated (nor are the handwritten notes), making it difficult to determine when Thiel completed either one. Both Thiel's annotated copy of *The View from the Road* and the 12-minute notational score can be found in the Thiel MSS.

notation system. This can be partially explained by the drastically different intentions of the two notations: the MIT version primarily mapped roadways while Thiel's was more interested in mapping intimate experiences like walks through Japanese shrines. Although each notation system could conceivably have been used to map varied scales, their overall goals, too, diverged. The MIT authors sought to improve city structure through the design of high-speed roadways while Thiel wanted to improve the walkability of urban spaces. Or, on a more basic level, it is also possible that each notation was so idiosyncratic and difficult to use that it could only be easily employed by the person who had developed it, making attempts to develop a tandem notation system pointless.

However, in 1967, Thiel made at least one attempt to gather all of the notation systems together. He had been interested in Halprin's work on notation as early as 1963, when he wrote a review of Halprin's book, *Cities*, for the journal *Landscape* (see Chapter 4). Indeed, both Thiel and Halprin cited the precedent of dance notation in their publications and attempted to draw connections between their own approach and dance choreography. Four years later, after Halprin had published his "Motation," Thiel sent him a letter asking if Halprin would be willing to collaborate on a project that would compare all of the notation systems created to date. Thiel wrote, "It seems now that there are at least 7 systems in use: your "Motation," Lynch's, mine, Stuart Rose's, and 3 systems I have seen here![681] The thought occurred to me that it would be worthwhile to all of us, in this healthy situation, to work up a direct comparison: that is, for each of us to

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[681] Rose's notation is discussed in the conclusion to this dissertation but the author has been unable to identify the three other systems of notation to which Thiel refers.

notate the same sequence-environment. If I provided you with a detailed topo map and a set of wide-angle photos, would you be interested in writing out the notation in your system?"[682] In Halprin's response, he expressed interest in collaborating and agreed that there seemed to be "vast interest" in the topic. Halprin wrote further: "I must say I hope a book could result from this which would not only explore our systems but the whole trend in space-time notation including music (a field in which a great deal of work is being done)."[683]

Unfortunately, despite their shared interest, it does not appear that the correspondence was continued, nor was there a book ever published on the topic. However, Thiel's contact with both Lynch and Halprin functioned to draw together their three systems of notation and served as a link between MIT on the east coast and Berkeley on the west, a link that only expanded over the years as students, teachers, and researchers moved from one school to the other, from William Wurster in the 1950s to Donald Appleyard in the 1960s. These new notation systems, which were rather quirky and idiosyncratic, all suffered from difficulties of interpretation and usage, not to mention a lack of publicity in wider architectural education and practice; thus, Thiel's endeavor to ally his notation with both *The View from the Road* and "Motation" can be understood as a similar effort to Halprin's in his article to find a larger justification and context for the little-used and relatively unknown tool of architectural space time notation.

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[682] Letter, Philip Thiel to Lawrence Halprin, n.d. (c. 1967), Folder "Motation - article," call no. 014.I.A.6091, Halprin Collection.

[683] Letter, Lawrence Halprin to Philip Thiel, 8 November 1967, Folder "Motation - article," call no. 014.I.A.6091, Halprin Collection.

CHAPTER 6

Later Research on the View *of* the Road at MIT

After *The View from the Road* was published, both Appleyard and Lynch continued to test the techniques and methodologies of visual analysis. Over the years, Appleyard wrote about the possibilities of using graphic and symbolic notation in order to analyze sequential form and create patterns of movement within a city.[684] Appleyard's dedication to examining the perceptual effect of city form, nurtured through his research and collaboration with Lynch, continued through the rest of his career in articles and books on not only urban design and planning, but also on topics as disparate as environmental psychology and transportation graphics.[685] In 1967, after Appleyard joined the faculty of the University of California, Berkeley, he went on to collaborate with psychologist Kenneth Craik in the establishment of the Berkeley Environmental Simulation Laboratory, where they engaged in innovative research over the following

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[684] See, for example, Donald Appleyard, "Motion, Sequence and the City," In *The Nature and Art of Motion*, ed. Gyorgy Kepes, 176-192 (New York: George Braziller, Inc., 1965),189 and Donald Appleyard, "Understanding Professional Media: Issues, Theory, and a Research Agenda," in *Human Behavior and Environment*, eds. Irwin Altman and Joachin F. Wohlwill, 43-88 (New York: Plenum Press, 1977), 75.

[685] See Donald Appleyard, "Transportation Graphics," *Dot Zero* no. 5 (Fall 1968): 26-31. See also Kathryn H. Anthony, "Major Themes in the Work of Donald Appleyard," *Environment and Behavior* 15 no. 4 (July 1983): 411, and Dana Cuff and Kenneth H. Craik, "The Writings of Donald Appleyard," *Places* 1 no. 3 (Winter 1984): 75-81, both published on the occasion of Appleyard's untimely death at the age of 54 in 1982, and both of which review many of his major publications and references.

decades examining filmic simulation techniques for the design of urban spaces.[686] Meanwhile, Lynch continued to experiment with the possibilities of visual analysis; in the early 1970s, he prepared a study on the visual form of Martha's Vineyard,[687] which, along with Lynch's study of Brookline, Appleyard later praised as "models of environmental analysis which should be far better known."[688]

More importantly, however, both Lynch and Appleyard began during this time to address one of the most significant criticisms of *The View from the Road*: its failure to consider the importance of the view *of* the road. In an unpublished draft of 1966 titled "Sensuous Criteria for Highway Design," the two men assessed the concerns of the user of the road versus the non-user, acknowledging that highways could be judged for their effect on not only the driver, but also the nearby resident or bystander.[689] In the first half of the paper, subheaded "The View of the Road," Lynch and Appleyard examined the negative effects of the highway on the landscape and identified various means of mitigating those effects. Sensory losses incurred through noise, air, and microclimate pollution could be lessened through the addition of natural parks and recreational areas, with various devices suggested to buffer the effects of noise, glare, and microclimate

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686 See Anthony, "Major Themes, 413; and Cuff and Craik, "Writings of," 76-77. The work of the Berkeley ESL was also published more recently in Peter Bosselmann, *Representation of Places: Reality and Realism in City Design* (Berkeley: University of California Press, 1998).

687 See in particular: Vineyard Open Land Foundation with Kevin Lynch & Sasaki, Dawson & Demay Associates, Inc., *Looking at the Vineyard: A Visual Study for a Changing Island* (West Tisbury, MA: Vineyard Open Land Foundation, 1973). In this report, Lynch contributed to a visual analysis of the form and structure of Martha's Vineyard, where he owned a vacation home.

688 Appleyard, "Works of Kevin Lynch," 551.

689 Donald Appleyard and Kevin Lynch, "Sensuous Criteria for Highway Design (DRAFT)," February 1966, Kevin Lynch Papers, MC 208, unprocessed box 4b, folder "Highway Criteria," Lynch MSS, 1.

disruption.[690] In order to avoid the loss of meaningful visual or symbolic centers, the authors recommended a systematic assessment early in the planning process that would identify all historical and cultural places along the right of way.[691]

Perhaps as a response to the criticisms of their 1964 book, which privileged not only the view *from* the road but also the agency of the planner above all else, Lynch and Appleyard noted in their draft that all resources should be evaluated not only by highway planners, but also by residents in order to determine some form of community consensus.[692] Once these areas and elements were identified, the highway route should deliberately avoid them. However, the visual potential of the highway was still of interest to both authors and they insisted that the highway should not "destroy a fine view, or shut off psychological access between one section and another, as by visually disrupting a customary line of approach, or a continuous linkage of activity."[693] They urged that visual connections and physical access could be reestablished under and around the highway through elevation changes and pedestrian routes.[694]

In discussing how to reconcile the view from the road with the view of the road – an obstacle they had conveniently ignored in their book – the authors noted that the conflicts were more intense when the users of the highway and the people who lived in the highway corridor were of distinct groups, such as suburbanite commuter versus city resident. Unfortunately, even here they failed to fully consider how these two views

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690 Appleyard and Lynch, "Sensuous Criteria," 2-5.

691 Appleyard and Lynch, "Sensuous Criteria," 5.

692 Appleyard and Lynch, "Sensuous Criteria," 6.

693 Appleyard and Lynch, "Sensuous Criteria," 6.

694 Appleyard and Lynch, "Sensuous Criteria," 6-9.

could be pragmatically aligned, arguing that the potential of the highway as source of utility and pleasure for all people had to be acknowledged, whether they were behind the wheel of a car or gazing upon the highway from below. Ultimately, they came to the same conclusion, that it was of paramount importance not to "defer the 'looks' of a road to a final application of cosmetics, when damage and ugliness can only be ameliorated. The sensuous quality of a road, or of a system of roads, must be considered from the beginning."[695]

That same year, in 1966, Lynch, Appleyard, and Myer, along with three other members of the MIT faculty, were involved in the examination of alternate routes for the Cambridge portion of the Inner Belt. Over the years since the initial proposal of the Inner Belt, various alliances between urban professionals, citizen activists, and Cambridge Planning Committees combined to prepare various alternate proposals for the Cambridge section of the Belt route.[696] The MIT professors analyzed the alternate route prepared by the Cambridge Committee on the Inner Belt, formally endorsing it over the official state route "as the least damaging of those that have been proposed," and concluding that they "would strongly recommend it to the consideration of the Cambridge City Council and the Massachusetts Department of Public Works." Lynch, Appleyard and Myer expressed their recommendations in a one-page letter, co-authored with three faculty members in the Department of City Planning: Bernard Frieden, Associate Professor; Philip Herr, Lecturer; and Stephen Carr, Instructor. In it, they note that their opinions did not signify

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[695] Appleyard and Lynch, "Sensuous Criteria," 30.

[696] In fact, the City of Cambridge Planning Board had commissioned its own study of the proposed Inner Belt route through Cambridge in the 1950s. See Bruce Campbell & Associates, *Study of the Belt Expressway through Cambridge* (Cambridge, MA, 1957).

any official position of either MIT or the School of Architecture and Planning but that they were “seriously concerned about the effects on homes, businesses and institutions of any Inner Belt location through Cambridge.”

They noted that they favored the alternate route along Portland and Albany Streets over both the DPW’s official proposed route and another alternative prepared by the firm of Barton-Aschman, because it did the least damage to Cambridge. [697] Although it cannot be determined whether they tested out the alternate routes with their new notation system, it is clear that their decision was swayed more by their view *of* the road in this case than by the view *from* the road, despite their continued insistence in their writings and research on the priority of visual concerns. When the problem was in their backyard and they found themselves in the position of the resident of the highway corridor rather than the driver on the freeway, they privileged the pragmatic over the visual. In the end, the highway was never built: after the state again endorsed its own favored route over the alternatives examined by the Cambridge constituencies in 1967, the Cambridge City Council prepared a memo to the federal highway administrator noting that it not only opposed the state-supported route through Cambridge, it opposed all Inner Belt routes through Cambridge.[698] Thus, by 1967, opposition had mounted against the whole project,

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[697] Although the letter is undated, all of the routes to which they refer were being developed and considered in the period between 1965 and 1967. Lupo, *Rites of Way*, 16-20. The letter was most likely written in either February or March of 1966, as it refers to “a meeting on last Thursday, February 24th,” a date which corresponds to the year 1966. See Letter, Kevin Lynch, Bernard Frieden, Donald Appleyard, John R. Myer, Philip Herr, and Stephen Carr to Whom It May Concern, n.d., Kevin Lynch Papers, MC 208, unprocessed box 2, folder “Miscellaneous,” Lynch MSS.

[698] Lupo, 16-20.

not just its proposed locations; by the 1970s, the governor had called for a moratorium on all Inner Belt freeway construction in the Boston area.[699]

Perhaps due to the controversy over the location of the Inner Belt in Cambridge, in 1968 Lynch finally began to consider some of the most pressing social, economic, and moral issues involved in highway construction, from the use of eminent domain to dispossess individuals and businesses of property to the forcible relocation of large segments of the city's poor and minority populations. In a draft from that year titled "Should We Built More Freeways in the Center City?" Lynch argued that the full costs of urban highway construction had to be expanded to include the hidden "personal and social costs of forced removal and community disorganization, for the elderly and the place-bound in particular,"[700] the destruction of potential open space as a community resource, the "barrier effect of freeways, which divide communities or limit the access to services," and environmental costs of air and noise pollution.[701] Given these costs, Lynch argued that the building of urban freeways was legitimate if and only if two conditions were met: first, that it was unquestionably the most efficient way of ensuring regional mobility and access, and, second that the personal, financial, and other costs of forced relocation were openly counted and "reimbursed." He called for not only relocation payments and subsidies to renters, but also the replacement of all amenities taken by the highway – including open spaces, activities, and institutions – as well as the enforcement

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[699] Lupo, 3; and James A. Aloisi, *New England Remembers The Big Dig* (Beverly, MA: Commonwealth Editions, 2004), 11-12.

[700] Kevin Lynch, "Should We Build More Freeways in the Center City (DRAFT), June 1968," Kevin Lynch Papers, MC 208, unprocessed box 14, folder "Should we build more freeways in the center city? 1968," Lynch MSS, 2 -3.

[701] Lynch, "Should We Build More Freeways," 2-3.

of codes for pollution abatement in communities along the right of way. He wrote further that a highway that created a barrier within a stable neighborhoods or disrupted a central or meaningful connection or access route should simply not be built.[702]

Lynch asserted that many of the costs were not only hidden, but also exacted from "poor inner city populations who receive relatively little direct benefit from the freeways themselves."[703] He highlighted the psychological and emotional costs of forced relocation, noting the "the personal grief of relocation, loss of community, and detachment from familiar places, loss of irreplaceable things: historic or sentimental locales, unique buildings or landscapes, [and] activities which will not survive removal."[704] Lynch ended the draft calling for a more comprehensive approach to transportation planning, which considered the needs of the entire population: "Freeway construction must be accompanied by improvement and encouragement of other modes of transportation, to equalize accessibility for the poor, the handicapped, the young and the old."[705] This draft, written four years after the publication of *The View from the Road*, reflected Lynch's changing awareness of the urban realities of the time period, from the racial tensions that were tearing apart urban areas in the late 1960s to a new awareness of how the raze-and-redevelop approach of the urban renewal practices of the previous two decades had contributed to the disenfranchisement of minority and poor populations. In this draft, following the negative criticisms of *The View from the Road* and the debates in Cambridge over the location of the Inner Belt, Lynch finally turned his

[702] Lynch, "Should We Build More Freeways," 3-4.

[703] Lynch, "Should We Build More Freeways," 3.

[704] Lynch, "Should We Build More Freeways," 4.

[705] Lynch, "Should We Build More Freeways," 5.

inquiry from the aesthetic and visual to the social and economic.[706] It was perhaps becoming clear that these issues could certainly not be addressed with graphic notation and required a far more comprehensive and interdisciplinary approach than could be achieved through urban design alone.[707]

MIT Research on Urban Form and the Legacy of Cognitive Mapping

Even before it was published, *The View from the Road* had spurred at least one offshoot study in MIT's Department of City and Regional Planning, in which the connections between high-speed movement and urban mapping were further researched. A progress report for this pilot study, titled "Vision and Memory in The View from the Road," was prepared in 1964 by Stephen Carr and George Kurilko, both graduate students at MIT in the early 1960s, and reported on a research program to investigate subjects' eye movements during highway trips in order to determine where visual

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[706] Lynch did briefly discuss the visual impact of the highway in the draft, counting "the ugliness of the resulting product for driver and abutter alike" among the substantial costs of highway construction and emphasizing in turn that the freeway should be built only if "the view of and from the road is not an ugly or a meaningless one" (Lynch, "Should We Build More Freeways," 3, 4).

[707]Through 1967, over 400,000 families were dispossessed by urban renewal alone, combined with an additional 330,000 by urban interstate highway construction. Frieden and Sagalyn, 29. Of these residents, the overwhelming majority consisted of minorities and the poor. This was due to a combination of factors, including racism, the lower cost of land in these areas, and the residents' relative lack of powerful political connections. Frieden and Sagalyn, 28. Although urban renewal procedures required cities to submit relocation plans for dispossessed residents complete with evidence of sufficient relocation housing as a prerequisite for federal aid, studies have shown that many dispossessed families moved into conditions just as bad, if not worse, than the housing they had before. Frieden and Sagalyn, 31-32. Moreover, the relocation payments supposedly guaranteed to all displaced citizens and businesses were often not distributed; only half received any kind of payment at all. Frieden and Sagalyn, 33. The highway construction program yielded even worse results: the Federal-Aid Highway Acts of 1956 did not specify that the dispossessed receive any moving assistance or moving expenses, let alone relocation payments. Although the Highway Act of 1962 required cities to provide the dispossessed with assistance locating new housing and provided for moving expenses of $200 per family and $3000 per business, only twelve states had authorized such payments over the following two years. Most often, displaced residents were provided with only advisory services on where to look for new housing. Frieden and Sagalyn, 30-31.

attention was drawn, what factors most influenced direction of attention and vision, and how frequently the subjects' eyes moved.[708] Over the following years, the study was refined and statistical analyses applied; in the meantime, Carr taught a class in 1967 at MIT on "Psychological Functions of Environmental Form," which included multiple reading references in the field of psychology, including Gibson's *The Perception of the Visual World*.[709] The study was finally published in 1969 in the journal *Environment and Behavior*. Titled "The City as a Trip: Perceptual Selection and Memory in the View from the Road," the paper was co-authored by Carr, who was by then an Assistant Professor of Urban Design at MIT, and Dale Schissler, an Assistant Professor of Psychology at Northeastern University in Boston.[710] Over the following years, increasing connections between the study of perception in architecture/urban design and psychology began to appear.[711]

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[708] Stephen Carr and George Kurilko, *Vision and Memory in the View from the Road: A Progress Report* (Cambridge, MA: Joint Center for Urban Studies of M.I.T. and Harvard University and M.I.T. Department of City and Regional Planning, 1964). Both Carr and Kurilko were graduate students in the Department of City and Regional Planning in the early 1960s; Kurilko had been part of Appleyard's Fall 1962 seminar on Ciudad Guayana.

[709] Stephen Carr, "Selected Bibliography, 11.35 Carr, Potter," Fall 1967, Kevin Lynch Papers, MC 208, unprocessed box 3, folder "Urban Landscape: Bibliographical References," Lynch MSS.

[710] Stephen Carr and Dale Schissler, "The City as a Trip: Perceptual Selection and Memory in the View from the Road," *Environment and Behavior* 1 no. 1 (June 1969): 7-35.

[711] See, for example, a thesis written by a student under Kevin Lynch's supervision: Erik Albin Svenson, "Differential Perceptual and Behavioral Response to Change in Urban Spatial Form," (PhD Diss., Massachusetts Institute of Technology, Department of City and Regional Planning, September 1967). See also work published by Michael Benedikt on isovists and isovist fields in the 1970s and 1980s. Although Benedikt's work can be understood as emerging from a long history in which the mechanisms of spatial perception were the subjects of study, the attempt to create visible crossovers between the fields of cognitive science and architectural/urban design became notably more focused in the latter half of the twentieth century. See Michael Benedikt, "To take hold of space: isovists and isovist fields," *Environment and Planning* B 6 (1979): 47-65; Michael Benedikt, "Perceiving Architectural Space: From Optic Arrays to Isovists," *Persistence and Change: Proceedings of the First International Conference on Event Perception*, eds. William H. Warren, Jr., and Robert E. Shaw, 103-114 (Hillsdale, NJ: Lawrence Erlbaum Publishers, 1985); and Larry S. Davis and Michael Benedikt, "Computational Models of Space: Isovists and Isovist Fields," *Computer Graphics and Image Processing* 11 no. 1 (September 1979): 49-72. Finally, see Paul L.

In his appraisal of "The Major Published Works of Kevin Lynch" of 1978, Appleyard commented, "*The Image of the City*, more than any other work, initiated what has become a flourishing and significant new field of activity in planning and design, the study of environmental psychology, relating the physical environment to human behaviour."[712] Appleyard drew attention to "the spurt of research in environmental psychology that took place in the late 1960s, which looked to *The Image of the City* as a source of inspiration and legitimacy."[713] Indeed, in a publication of 1973 titled *Image and Environment: Cognitive Mapping and Spatial Behavior*, Lynch's book was recontextualized as part of a growing body of related research on how individuals mentally orient within their physical environment. The concept of cognitive mapping, as introduced by Edward Tolman in the 1940s (see Chapter 1), emerged as a touchstone for studies in not only planning and psychology, but also geography and, more generally, the interdisciplinary field of environmental design.[714]

In *Image and Environment*, cognitive mapping was defined as "a process composed of a series of psychological transformations by which an individual acquires, codes, stores, recalls, and decodes information about the relative locations and attributes of phenomena in his everyday spatial environment."[715] This process, the authors

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Connolly, "Part II," In Visual Considerations of Man, the Vehicle, and the Highway (New York: Society of Automotive Engineers, Inc., 1966), 27-87 and Leslie S. Pollock, "Relating Urban Design to the Motorist: An Empirical Viewpoint," in *Proceedings of the Environmental Design Research Conference at UCLA*, ed. William J. Mitchell (Los Angeles: University of California, Los Angeles, 1972).

712 Appleyard, "Works of Kevin Lynch," 552.

713 Appleyard, "Works of Kevin Lynch," 552.

714 Roger M. Downs and David Stea, *Image and Environment: Cognitive Mapping and Spatial Behavior* (Chicago: Aldine Publishing Company, 1973), xvii.

715 Downs and Stea, 9.

asserted, was based on "phenomena so much part of our everyday lives and normal behavior that we naturally overlook them and take them for granted."[716] Despite its title, the authors asserted, a cognitive map was map-like only in a functional sense, in that it allowed the individual to navigate spatial situations. However, as they noted, "Drawing upon Lynch's (1960) attractive and appealing series of cognitive maps of U.S. cities portrayed as cartographic maps," it was possible to state that "the cartographic map has had a profound effect on our concept of a cognitive map."[717] *The View from the Road*, which grew from the same body of research as *The Image of the City* on The Perceptual Form of the City, was grounded on the concept of the cognitive map and how it could be transformed – and even augmented – from a circumferential urban roadway at high speeds. However, by the end of the 1960s, the notation in *The View from the Road* had finally taken a backseat to the more pressing social and economic urban issues of the time.

Halprin and Freeways

Halprin himself published his own text on the potential of molding the space-motion experience along the highway in 1966. Following several years of work on developing alternate locations for San Francisco's freeways, Halprin's proposals of 1964-65 for San Francisco's highways were never implemented (see Chapter 4). Indeed, in 1966, after having rebuffed the state's proposals five times already, the San Francisco

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[716] Downs and Stea, 8.

[717] Downs and Stea, 11. The book, which is largely a collection of essays on the subject of cognitive maps and spatial representation by authors from a wide range of disciplines, includes essays by both Appleyard and Lynch. See Donald Appleyard, "Notes on Urban Perception and Knowledge," 109-114; and Kevin Lynch, "Some References to Orientation," 300-315.

Board of Supervisors issued a final rejection of the state's plans, consequently also turning away $280 million in federal-aid highway funding slated for two urban interstate highways – one of which was the Embarcadero.[718] However, Halprin published many of the conclusions from his unimplemented studies in *Freeways*, his first major publication after his book of 1963, *Cities*.[719] In this book, Halprin analyzed types of urban freeways, the functions they served, and how they could be designed to integrate into their surroundings. Like the MIT authors before him, Halprin wrote of the potential of the highway to be a work of art, with the potential to create a new understanding of the city through the manipulation of the high speed experience of movement through space.[720] He referred obliquely to Lynch's text of 1960, criticizing contemporary practices of freeway design in which "no attention at all has been paid to their impact on the image of the city. Views have been obliterated, important landmarks have been isolated, great waterfronts have been cut off, all by freeways within the cities whom they supposedly serve."[721] Like Appleyard, Lynch, and Myer, Halprin also believed in the potential of movement along the freeway to transform the urban experience: "In the city new vistas unfold because of elevated freeways; vast panoramic views are disclosed which were never seen before. The great vivid skylines of the city can be seen, all of a sudden, not as a static picture, but as a series of constantly changing impressions which move by like the

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718 Johnson, "Captain Blake," 74; and Kelley, *Pavers and Paved*, 95.

719 Lawrence Halprin, *Freeways* (New York: Reinhold Publishing Corporation, 1966). See acknowledgements, where Halprin noted "the debt I own to the many fine engineers of the California State Division of Highways who were patient enough to listen to me, though we did not always agree, and who often have had to keep my enthusiasms within bounds of hard engineering facts."

720 Halprin, *Freeways*, 5.

721 Halprin, *Freeways*, 27.

frames in a motion picture."[722] Halprin included a few illustrations of his Motation in his text, but they merely rehashed the material he had just published in *Progressive Architecture* the previous year.[723] Halprin continued to develop criteria for the design of urban highways over the following years, serving as an urban advisor for a federal commission on the planning and design of urban freeways between 1965 and 1968.[724]

Ultimately, for Halprin, "Motation" became subsumed into his larger concept of scoring, which achieved final form in his book of 1969, *RSVP Cycles*: *Creative Processes in the Human Environment*.[725] In this book, Halprin's approach to scoring was informed by notational processes that extended from music, dance, and theater to football plays, tarot cards, the I Ching, and Navajo sand paintings.[726] As Ann noted about her husband's process of notation, "He was so important in the avant-garde community because he evolved a scoring method, a way of working collectively, creatively, because

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[722] Halprin, *Freeways*, 23.

[723] Halprin, *Freeways*, 87-89.

[724] See Michael Rapuano, Lawrence Halprin, Thomas C. Kavanagh, Harry R. Powell, Kevin Roche, John O. Simonds, and Marvin R. Springer, *The Freeway in the City: Principles of Planning and Design* (Washington, D.C.: U. S. Government Printing Office, 1968).

[725] See Lawrence Halprin, *RSVP Cycles: Creative Processes in the Human Environment* (New York: George Braziller, Inc., 1969).

[726] Among the scores illustrated in *RSVP Cycles* was one for a Motation sequence of Nicollet Avenue in Minneapolis (see Halprin *RSVP Cycles*, 68-69 for score and pgs. 70-77 for photographs). The score uses the later framework published in his "Motation" article in *P/A* 1965 but is undated and is, moreover, the only record this author could find of a score for this project on paper. It was not drawn until at least 1967 because the designer credited in *RSVP Cycles* with drawing the score, Curtis Schreier, did not begin working for Halprin's office until 1967, the year he graduated with his degree from the Rhode Island School of Design. He moved to San Francisco and worked with Halprin until 1970 in many different capacities, including as a photographer for Larry and Ann's Experiments in Environment of 1968, before joining the architecture firm Ant Farm. Felicity D. Scott, *Living Archive 7: Ant Farm* (Barcelona and New York: Actar, 2008), 34. For the Nicollet Avenue project, Halprin converted a central avenue in downtown Nicollet into a pedestrian and transit mall; the project was completed in 1967, making it difficult to determine whether the score was completed after the fact as demonstration of the notation for *RSVP Cycles*, or actually used in the final phases of the project as a tool of design. "The Chronology," 127.

collaborators didn't have a grounded way of working together."[727] Halprin's focus on community participation carried through into his radical "Take Part" and "Taking Part" Workshops of the 1970s, which were designed to engender citizen participation in the larger planning process.[728] These workshops used the open-ended and inclusive concept of scoring Halprin developed in *RSVP Cycles* as a means to engage individuals and create a community-based and accessible dialogue.[729] In his final words to "Motation," Halprin hinted at the potential of creating a total environment for individual participation: "the city comes alive [only] through movement and its rhythmic structure. The elements are no longer merely inanimate. They play a vital role, they become modulators of activity and are seen in juxtaposition with other moving objects. Within the space, movement flows; paving and ramps become platforms for action; the street furniture is used; the sculpture in the street is seen and enjoyed; and the whole city landscape comes alive through movement as a total environment for the creative process of living. It is as a tool to help achieve these aims that the Motation System has been developed."[730]

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727 Bernstein, *Tape Music Center*, 235.

728 "The Chronology," 134.

729 See the following for Halprin's own descriptions of his "Take Part" workshops and his participatory planning process in general: Lawrence Halprin & Associates, *Take Part: A report on new ways in which people can participate in planning their own environments* (San Francisco and New York: Lawrence Halprin & Associates, 1972); and Lawrence Halprin and Jim Burns, *Taking Part: A Workshop Approach to Collective Creativity* (Cambridge, MA: MIT Press, 1974). See also Alison Bick Hirsch, "Lawrence Halprin: Choreographing urban experience" (PhD diss., University of Pennsylvania, 2008); and Jim Burns, "The How of Creativity: Scores & Scoring," in *Lawrence Halprin: Changing Places*, 57-58.

730 Halprin, "Motation," 130.

Thiel in Seattle and the Pursuit of a Comprehensive Notation, 1964-

Thiel remained on the faculty of the University of Washington in Seattle for the remainder of his career. He chose to remain an academic, teaching, lecturing and conducting research rather than entering into professional practice and trying – albeit without success – to incorporate his notation into the design curriculum of schools of architecture and planning. Because Thiel chose to remain in academia, he was paradoxically never able to use his notation in the design of any built projects. Instead, he devoted his time to expanding his notation, publishing several articles in the early 1960s on its development and the necessity of designing the environment sequentially.[731] In 1964, he published an article in the AIA Journal titled "Processional Architecture," in which he analyzed the practice of sequential design across history, from Gothic cathedrals and Egyptian temples to the Greek acropolis and Japanese shrine.[732] He also continued to research Japanese methods of environmental design and representation, publishing two articles from 1963-1964 on the topic in the Urban Planning and Development series of the University of Washington, one titled "The Problem of Sequential connectedness in the Urban Environment," and another on "Movement in Japanese Environmental Representation.[733]" In the late 1960s and early 1970s, Thiel co-authored his first paper in *Environment and Behavior*, a journal he had helped to found in

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[731] See Philip Thiel, "Space, Sequence, and a Syllabus" (paper, Education for Urban Design Conference, University of Washington School of Architecture, Seattle, WA, January 8-10, 1962); and Philip Thiel, "Environmental Design on the Basis of Sequential Experience: a note on new American tools and old Japanese examples" (working paper, University of Washington, Seattle, 1963).

[732] Philip Thiel, "Processional Architecture," *AIA Journal* 41 no. 2 (February 1964): 23-28.

[733] Philip Thiel, "The Problem of Sequential Connectedness in the Urban Environment," *University of Washington Department of Urban Planning Development Series* no. 1 (1963): 1-11; Philip Thiel, "Movement in Japanese Environmental Representation," *University of Washington Department of Urban Planning Development Series* no. 3 (1964): n.p.

the 1960s,[734] published articles on his notation in French and German,[735] and held workshops with students in Japan, Denmark, Norway, and Austria to teach them his notation system and instruct them in its use.[736] He also taught several quarters of a class in Seattle on "Environmental Experience" in which the students became familiar with his "anatomy of space," learned how to use his notation, and explored its applications to a wide array of environmental experiences from movement to actions and even emotions.[737] Under his supervision, several students completed theses as part of their Masters of Architecture degrees that investigated issues of design methodology or environmental experience.[738]

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[734] Gary Winkel, Roger Malek and Philip Thiel, "The Role of Personality Differences in Judgments of Roadside Quality," *Environment and Behavior* 1 no. 2 (December 1969): 199-223. This article grew from a research study on the "Response to the Roadside Environment," undertaken by the three authors between 1965 and 1968, that was sponsored by the Outdoor Advertising Association of America in order to develop techniques to study the behavior of drivers on the highway. See Gary Winkel, Roger Malek and Philip Thiel, *Response to the Roadside Environment: A Study of Human Response to Visual Environments along the Urban Roadside* (Arthur D. Little, 1968). In 1970, Thiel published another article in a social science source in which he again described the notation and provided examples of its use: Philip Thiel, "Notes on the Description, Scaling, Notation, and Scoring of Some Perceptual and Cognitive Attributes of the Physical Environment," in *Environmental Psychology: Man and His Physical Setting*, eds. Harold Proshansky, William H. Ittelson and Leanne G. Rivlin, 593-619 (New York: Holt, Rinehart and Winston, 1970).

[735] Philip Thiel, "La Notation de l'Espace, du Mouvement et de l'Orientation," *L'Architecture d'Aujourd'hui* 40 no. 145 (1969): 49-58; Gunter Nitschke and Philip Thiel, "Anatomie der gelebten Umwelt," *Bauen + Wohnen* 9 (September 1968): 313-320 and IX 29; Gunter Nitschke and Philip Thiel, "Anatomie des gelebten Raumes," *Bauen + Wohnen* 10 (October 1968): X1-X5; and Gunter Nitschke and Philip Thiel, "Entwicklung einer modernen Darstellungsmethode bewegungszeit- und stimmungs-strukturierten Umwelterlebnisses," *Bauen + Wohnen* 12 (December 1968): 1-16.

[736] Thiel, Interview. Various diagrams from sessions and classes with students exist in the Thiel MSS. See the following, all located in Box C, Folder "Historical Precedents [correspondence, notes, and notations]": A. Ing, "Sequence Design," November 22, 1961; Michael T. Headman, "Space Notation Development," December 1, 1961; Richard W. Hobbs, "Space Translation," December 1, 1961; and K. Mattson, "Space Sequence Translation," December 1, 1961.

[737] See Philip Thiel's problem- and data-sheets, located in the following folders on "Environmental Experience Class Materials" in Box C in the Thiel MSS: "Winter Quarter 1970, "Spring Quarter 1970, Introductory and Advanced Sections," "Summer Quarter 1970," "Fall Quarter 1970," "Winter Quarter 1971," and "Spring Quarter 1971."

[738] Other student theses completed under his supervision included the following: Hirokazu Okugawa, "Notes on Design Tools: Ellipsoid Perspective," (master's thesis, University of Washington, Seattle, 1970),

In 1965, Stuart Rose wrote a thesis at the University of Washington, Seattle, titled "A Method for Describing the Quality of an Urban Street Space," in which he examined the physical qualities that defined the urban street space and developed a system for classifying them, using some basic mathematical and statistical processes.[739] Although Thiel was not one of Rose's advisors, Rose noted in the acknowledgements to his thesis that Thiel provided invaluable assistance during the formative stages of his project. Three years later, Rose built upon his earlier thesis and Thiel's notation concept to create a system of notation that he hoped could be programmed into a computer to yield a digitized representation or television simulation of the notated space. This notation was far simpler, visually, than anything Thiel had designed, although it applied many of his concepts of spatial enclosure and defining spatial elements. Rose published his notation in 1968 in both an article in *Architectural & Engineering News* and a book-length manuscript at the College of Education at Michigan State University, where Rose was Assistant Professor of Architecture.[740] Both the article and the manuscript contained a notational sequence of a 15-block journey through Seattle as an example, which was keyed to photographic snapshots as well as perspective sketches that showed what the simulated television image would look like, based on the notational inputs. (fig. 6.1)

Box B, Folder "[Hirokazu Okugawa, "Notes on Design Tools: Ellipsoid Perspective]," Thiel MSS; and Paul Tesar, "Reality, Experience, and Meaning: An Investigation into the role of interpretation in environmental experience" (master's thesis, University of Washington, Seattle, 1971), which examined theories of experience and investigated cognitive theories of environmental psychology.

[739] Stuart W. Rose, "A Method for Describing the Quality of an Urban Street Space," (master's thesis, University of Washington, Seattle, 1965).

[740] Stuart Rose, "On Beyond Models: Notation system simulates space," *Architectural & Engineering News* (January 1968): 36-39; and Stuart W. Rose, "A Notation/Simulation Process for Composers of Space" (East Lansing, MI: Michigan State University, College of Education, 1968). Rose commented in this manuscript of 1968 that he had consulted not only Thiel's work in developing his own notation, but also the work of Kevin Lynch, Donald Appleyard, and John Myer in *The View from the Road*, as well as that of Lawrence Halprin in "Motation." Rose, "Notation/Simulation Process," 8-9.

Although Rose discussed the possibility and potential of digitally programming the notation and selling consoles for roughly $50,000, it does not appear that such consoles were ever designed.[741]

In the late 1960s, a handful of architects and planners in addition to Rose published mapping and notation systems that attempted to record movement through space. All of these notations were elementary in concept and were never as fully developed as the three discussed in this dissertation, but they are worthy of mention here as they indicate interest in the same idea of recording movement in space and time. In 1966, an article titled "Urbanography" was published by two architecture professors at the University of Cincinnati, Samuel Noe and B. L. Abernathy, as a sequel to Halprin's "Motation" in *Progressive Architecture*.[742] Both authors were motivated by the concept of sequential urban design – Noe had been inspired by the concept of circulation as an organizing force in urban design during his studies at Harvard with Japanese architect Fumihiko Maki and Abernathy had studied with Lynch and Appleyard at MIT.[743] Although they briefly noted the work on notation completed by others before them, including the MIT Team, Thiel, and Halprin, they sought to encourage students to develop their own methods of visually representing urban sequence in studio classes. As published in the article, the result was not a single system of notation but rather a

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[741] Rose, "On Beyond Models," 38-39.

[742] Samuel Noe and B.L. Abernathy, "Urbanography," *Progressive Architecture* 47 (April 1966): 184-190. In the table of contents to this volume, the article is described as a sequel to "Motation." See "This Month in P/A," *Progressive Architecture* 47 (April 1966), 3.

[743] Noe and Abernathy, "Urbanography," 184.

compendium of students' attempts to represent visual sequential experience, mostly as symbols that could be used in aerial map views.[744]

In 1968, British architect Gordon Cullen, author of the "Townscape Studies" of the 1940s in *The Architectural Review*, published "Notation: The observant layman's code for his environment."[745] This report was the fourth in a series funded by Alcan Industries – an aluminum company – that was intended to explore new practices in city planning and experiment with the architectural possibilities of using aluminum.[746] In the first three reports of the series, published by Alcan as standalone entities, Cullen presented his concept for a circuit linear town.[747] This town would mediate between the decentralizing effects of the automobile and the universal need for a central city center.[748] The fourth report on "Notation," however, was published not only as its own booklet, but also as successive installments in the supplemental advertising sections of both *The Architects' Journal* and *The Architectural Review*, where Alcan had purchased advertising spreads.[749] Although it was called a notation, it was more of a schematic map-like diagram meant to indicate the location of all of the major visual and spatial

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[744] Noe and Abernathy, "Urbanography," 187-188.

[745] Gordon Cullen, *Notation: The observant layman's code for his environment* (Leicester and London: Alcan Industries, 1968).

[746] Gosling, *Gordon Cullen*, 75.

[747] Gordon Cullen, *A Town Called Alcan* (Leicester and London: Alcan Industries, 1964); Gordon Cullen, *4 Circuit Linear Towns: Solway, Solent, Redrose, London* (Leicester and London: Alcan Industries, 1965); and Gordon Cullen, *The Scanner* (Leicester and London: Alcan Industries, 1966).

[748] Gosling, *Gordon Cullen*, 75-81.

[749] The contents of the booklet were published in five installments in the following advertising sections of *The Architects' Journal* (supplement): May 31, 1967; July 12, 1967; August 23, 1967; September 27, 1967; and January 3, 1968. At least the first two installments were included in the advertising sections of *The Architectural Review*: June 1967 and August 1967. It is difficult to determine whether installments appeared in other issues of these two journals, or in other journals entirely, as the advertising sections of these journals are not included in any databases or indices.

elements in the urban landscape. (fig. 6.2) Symbols were given for pedestrian access, sight lines, visual barriers, and panoramic vistas, but all were sketched on an overhead plan view of the space being recorded. In this sense, it was neither temporal nor sequential, as the three discussed in this dissertation, but it did nonetheless seek to find a new way of visually representing the defining spatial and visual characteristics of the environment.[750]

This same year, in 1968, American architect Raymond Gindroz created a chart-based notation system that attempted to capture the major visual events experienced along a journey and was published in an article titled "Studies in Visual Structure for Urban Environments" as part of a larger book edited by David Lewis on *Urban Structure*.[751] In Gindroz's chart, the overall plan view of the journey was indicated in the left-most column while successive columns to the right provided space to mark off the locations of major spaces, dominant visual events, and secondary visual elements. Brackets were used to record how the spaces along the journey connected and overlapped while generic shapes showed the location of various visual elements.[752] (fig. 6.3) However, the notation was exceptionally difficult to read and functioned more as a tally of elements in space rather than as an attempt to create a continuous and sequential record of the overall journey.[753]

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[750] Cullen, *Notation*, 11.

[751] Raymond Gindroz, "Studies in Visual Structure for Urban Environments: Monumental vs. Popular," in *Urban Structure*, ed. David Lewis, 203-224 (New York: Wiley Interscience, 1968).

[752] Gindroz, "Studies in Visual Structure," 218.

[753] A similar chart-based system was developed in 1976 by Jürgen Joedicke, but it was even less of a sequential representation than Gindroz's. Joedicke developed symbols to describe spatial characteristics, which he then arrayed in a matrix-like chart that corresponded to serial photographs he had taken of the journey. Interestingly, he noted Thiel's notation as a precursor to his own system in his article, despite the

Neither Cullen nor Gindroz seem to have developed their systems further. Although both of their systems indicated similar impulses to record visual data, Cullen's depended on the abstract aerial view of the map while Gindroz's was based on a relatively fragmentary chart diagrams, neither of which indicated the observer's ultimate position within the larger space. In this way, their systems were less able to convey the sequential nature of the journey through space than even the framework used by the three notations discussed in this dissertation, which at the very least used a centerline that indicated the observer's location in space and which could be traced to convey the connection between his movement and the changing spatial characteristics that were recorded.

During this time in the late 1960s and into the 1970s, the processes of aerial mapping were developed in a number of related fields as well.[754] In architecture and planning departments across the country, advanced techniques were developed to map land use and open space[755] and to identify natural resources,[756] while in fields such as geography and psychology, techniques were developed to describe environmental

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fact that they were very different in structure and visual form. See Jürgen Joedicke, *Angewandte Entwurfsmethodik für Architekten* (Stuttgart: Karl Krämer Verlag, 1976).

[754] See James Corner, "The Agency of Mapping: Speculation, Critique, Invention," in *Mappings*, ed. Denis Cosgrove, 213-252 (London: Reaktion Books, 1999).

[755] See Philip H. Lewis, Jr., *State Housing Board Study of Recreation and Open Space in Illinois* (Urbana, IL: Illinois Housing Board, 1961).

[756] See R. Burton Litton, *Forest Landscape Description and Inventories: a basis for land planning and design* (Berkeley: Pacific Southwest Forest and Range Experiment Station in association with the College of Environmental Design of the University of California, Berkeley, 1968); and James J. Nighswonger, *A Methodology for Inventorying and Evaluating the Scenic Quality and Related Recreational Value of Kansas Streams: Includes Four Selected Streams* (Topeka, KS: Planning Division of the Kansas Department of Economic Development, 1970).

features.[757] A significant number of studies were undertaken at the Landscape Research Office at the Graduate School of Design at Harvard University, reflecting an increasing focus there on the connections between landscape design, urban mapping, and early computing technology.[758] Although all of these techniques analyzed the landscape from the aerial perspective, one can see a similar desire to gather visual data on the environment for use in design, preservation, and analysis.

Over the following decades, an exploration of the moving view of the city was taken up by a number of architects and planners. In 1965, Philip Johnson wrote of the temporal quality of architectural experience in an article in *Perspecta* titled "Whence and Whither: The Processional Element in Architecture."[759] Johnson stressed the importance of movement, writing that architectural experiences "are not static but temporal. The beautify consists in how you move into the space."[760] In 1967, Philadelphia planner Edmund Bacon wrote of the need to study the interconnections between all the modes of

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[757] See Joyce Vielhauer, "The Development of a Semantic Scale for the Description of the Physical Environment" (PhD diss., Louisiana State University, 1965); David Lowenthal, *An Analysis of Environmental Perception: An Interim Report to Resources for the Future, Inc.* (New York: American Geographical Society; Cambridge, MA: Harvard University, 1967); and an article written by psychologist Kenneth H. Craik: "The Comprehension of the Everyday Physical Environment," *Journal of the American Institute of Planners* 34 no. 1 (January 1968): 29-37.

[758] See Grant R. Jones, *Preliminary Report for Classification and Evaluation of Visual Landscapes* (Cambridge, MA: Landscape Architecture Research Office of the Harvard University Graduate School of Design, 1966); Raymond K. Belknap and John G. Furtado, *Three Approaches to Environmental Resource Analysis* (Washington, D.C.: The Conservation Foundation, 1967); Peter Jacobs and Douglas Way, *Visual Analysis of Landscape Development* (Department of Landscape Architecture, Harvard Graduate School of Design, 1968); and an article by Carl Steinitz, Assistant Professor of City Planning and Landscape Architecture at Harvard: Carl Steinitz, "Meaning and the Congruence of Urban Form and Activity," *Journal of the American Institute of Planners* 34 no. 4 (July 1968): 233-248. This focus on urban mapping in the landscape architecture department at Harvard in the 1960s and 1970s is a compelling topic worthy of further study but is not covered in depth here.

[759] Philip Johnson, "Whence & Whither: The Processional Element in Architecture," *Perspecta* 9 (1965): 167-178.

[760] Johnson, "Whence & Whither," 168.

travel used in a city space before undertaking any urban design work in the area. In his book, *Design of Cities*,[761] Bacon wrote that these "Simultaneous Movement Systems" could be identified by analyzing the main tracks through space that represented the path of movement of large numbers of people, whether by foot, automobile, or other means of travel. Once these paths were identified, the adjacent area could be designed to produce a continuous flow of harmonic experience that was sensitive to the various directions and speeds of travel in use within the space. Rather than tracking the movement of a single person, Bacon emphasized the importance of identifying how the majority of people moved through a space and then accommodating the design to those paths of movement. For example, in an early proposal for Philadelphia's Penn Center, Bacon sought to map the interactions and multi-level interchanges of subways, subway surface systems, and pedestrians to create continuous and clear patterns of movement.[762] (fig. 6.4)

In 1971, Reyner Banham immersed himself in the car culture of Los Angeles and marveled at the transformative potential of speed in the experience of the architectural and urban landscape.[763] Other architects, such as Robert Venturi and Denise Scott Brown, in *Learning from Las Vegas* (1972), and Alison Smithson, in *AS in DS: an eye on the road* (1983), explored how the higher speeds of automobile travel shifted one's perception of roadside architecture and called for an incorporation of this experience into architectural design.[764] The insatiable appetite of the American public for bigger, faster

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[761] Bacon was the executive director of the Philadelphia Planning Commission from 1949-1970. See front matter of Edmund Bacon's *Design of Cities* (New York: Penguin Books, 1967).

[762] Bacon, *Design of Cities*, 275, 278-279.

[763] Reyner Banham, *Los Angeles: The architecture of four ecologies* (New York: Harper and Row, 1971).

[764] See Robert Venturi, Denise Scott Brown and Steven Izenour, *Learning from Las Vegas: the forgotten symbolism of architectural form* (Cambridge, MA: MIT Press, 1972) and Alison Smithson, *AS in DS: an*

cars and the culture of automobility led to increased consideration for the urban view from behind the steering wheel and raised compelling questions on how, and for whom, the postmodern American city-highway complex should be designed. Many of these same concepts of capturing movement, space, and time in visual form have recently been discussed by Mitchell Schwarzer in *Zoomscape: Architecture in Motion and Media* of 2004, in which he analyzed photographic and filmic views of architecture at the higher speeds of travel, from the railroad to the automobile and the airplane.[765] In 2007, Peter Merriman argued in *Driving Spaces* that a new methodology of mobility had begun to permeate the research on highway design in the latter half of the twentieth century. In particular, he noted the increased interest in the embodied experience of the automobile driver as reflected Halprin's *Freeways* and *The View from the Road* as well as Banham's *Los Angeles* and *Learning from Las Vegas*.[766]

As Thiel continued to develop his own system of notation over the years, he remained intrigued by the possibility of developing a computer simulation that would augment his own written, visual system of notational representation.[767] It was not until the end of the 1980s, however, that one of Thiel's students developed a computer-based

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eye on the road (Delft: Delft University Press, 1983). For more on the former text, see Aron Vinegar, *I Am A Monument: On Learning from Las Vegas* (Cambridge, MA: MIT Press, 2008).

[765] Mitchell Schwarzer, *Zoomscape: Architecture in Motion and Media* (New York: Princeton Architectural Press, 2004).

[766] Peter Merriman, *Driving Spaces: A Cultural-Historical Geography of England's M1 Motorway* (Malden, MA: Blackwell Publishing, 2007), 1-2.

[767] Thiel gave at least two lectures in 1965, one at MIT and another at Bell Telephone Laboratories, in which he discussed the potential of correlating computer graphics and sequence-experience notation. See Letter, Robert Goodman (of the Joint Center for Urban Studies of MIT and Harvard) to Donald W. Heimbigner, 12 May 1965; and A. Michael Noll, Memorandum, "Visit of Professor Thiel from University of Washington to Bell Telephone Laboratories Incorporated, 22 December 1965;" both located in Box A, Folder "[Computer Programming of Visual Sequence Experience]," Thiel MSS.

program that would allow even a basic degree of correspondence between a notational input and a simulated image. In 1989, Robert Vizenor created CANVSS – Computer Aided Notation for Visual Sequence Simulation – as part of his Masters of Architecture Thesis, which was a graphic user interface between Thiel's notation and a three-dimensional modeling program. Although the project took initial steps towards correlating Thiel's sequence-experience notation with computer simulation, the user interface was fairly laborious and the computer graphics relatively elementary.[768] Today's digital tools, from virtual reality and computerized fly-throughs to even the freely available and user-friendly Google Street View, have succeeded where these attempts at computerizing the notation systems failed, due in part to rapid advances in digital technology that would have been unimaginable during the 1960s. More tellingly, however, these technologies have succeeded in incorporating themselves into mainstream use and practice because they offer an immediately understandable visual representation of reality, rather than one that depends on a laborious mental process of translation or interpretation.

Thiel himself continued to expand the notation and multiply its uses over the following 25 years.[769] The more intensively he worked on the notation, however, the more complicated and intricate it became, expanding to enormous size in an attempt to

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[768] Robert Vizenor, "Computer Aided Notation for Visual Sequence Simulation" (master's thesis, University of Washington, Seattle, 1989).

[769] During this time, Thiel also began to disseminate a proposal for a book on his notation to a number of colleagues, friends, and professional contacts for commentary and suggestions. Among those Thiel corresponded with in cognitive sciences and psychology were Rudolf Arnheim, renowned Gestalt psychologist and author of numerous books on art and psychology; Kenneth Craik, a psychologist at the University of California, Berkeley; and Charles Rusch, a psychologist at the University of Ilinois and later the University of California, Los Angeles. See Letter, Rudolph Arnheim to Philip Thiel, 2 November 1969, Box A, Folder "[Correspondence 1969-1980]," Thiel MSS; letters between Thiel and Craik, Box D, Folder "Craik," Thiel MSS; and letters between Thiel and Rusch, Box D, Folder "Rusch," Thiel MSS.

cover every describable aspect of a physical space. This included, for example, the number of people within the space, the activities they were performing, what they were wearing, where they were located, how they were moving, and what kinds of emotions they were revealing. Ultimately, the work he had completed on his notation system over the years was published in one large book by the University of Washington press, titled *People, Paths, and Purposes: Notations for a Participatory Envirotecture*.[770] By the time his book was published in 1997, the notation had become so bulky it was no longer easily learned nor easily used, and could certainly no longer be considered "shorthand." By trying to develop a notation that would describe every last detail of a space, he had shifted far from his initial and relatively more elegant goal: the scripting of physical movement through space.

Over the decades since the notation systems were first published in the 1960s, several well-known architects have experimented with alternative methods of visually representing movement and time in architecture, from Daniel Libeskind's "Micromegas Project" of 1979 to Bernard Tschumi's "Manhattan Transcripts" of 1976-1981 and Stan Allen's "Scoring the City" of 1986.[771] (figs. 6.5-6.6) Others, such as philosopher Nelson Goodman in his *Languages of Art*, have questioned the ability of notation in the arts as an

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[770] Philip Thiel, *People, Paths and Purposes: Notations for a Participatory Envirotecture* (Seattle: University of Washington Press, 1997).

[771] For more on Libeskind's project, see Christian W. Thomsen, *Visionary Architecture: From Babylon to Virtual Reality* (Munich and New York: Prestel, 1994), 150-152. For more on Tschumi, see Bernard Tschumi, *The Manhattan Transcripts* (London: Academy Editions, 1994) and Bernard Tschumi, "Disjunctions," *Perspecta* 23 (1987): 108-119. For Allen, see Stan Allen, "Mapping the Unmappable: On Notation," in *Practice: Architecture, Technique, and Representation*, 31-45 (Australia: G+B Arts International, 2000). Libeskind and Tschumi's works were also published in Jeffrey Kipnis's *Perfect Acts of Architecture* (New York: Museum of Modern Art, 2001).

authentic and accurate method of representation.[772] The impossibility of capturing every last detail of movement through space had in fact been noted much earlier in the century by Oskar Schlemmer, renowned artist and instructor at the German Bauhaus. In trying to develop a graphic notation that would capture the choreography for his Gesture Dance, (fig. 6.7) Schlemmer realized that "the more completely such a script tries to fix the total action, the more the multitude of essential details complicates the matter and obscures the very purpose of such a score, namely, legibility."[773] It is perhaps for this reason that the notations never succeeded in bridging the gap between recording actual, physical movement through space and designing a space that had yet to be created. When imagining such a space, it was impossible to determine how many details should be accounted for and recorded and, correspondingly, how many of these essential details could reliably be assumed to exist in the final product. The three systems of notation discussed in this dissertation did indeed suffer from this and many other flaws, as they required significant time, energy, and attention to decipher, let alone use. However, these early notations reflected an increased fascination in the 1950s and 60s with the experience of speed and motion, spurred by the possibilities of large-scale urban renewal and highway construction, and spoke eloquently to the possibilities – if not the practicalities – of scripting the city for the visual, embodied experience of movement in time and space.

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[772] Nelson Goodman, *Languages of Art: An Approach to a Theory of Symbols* (Indianapolis: Hackett Publishing Co., 1976). See also I-Fei Chang, "Architectural Notation: Reconception and Reconsideration" (master's thesis, Yale University, 1992).

[773] Oskar Schlemmer, "Theater (Bühne)," in Gropius, *Theater of the Bauhaus*, 86.

ILLUSTRATIONS

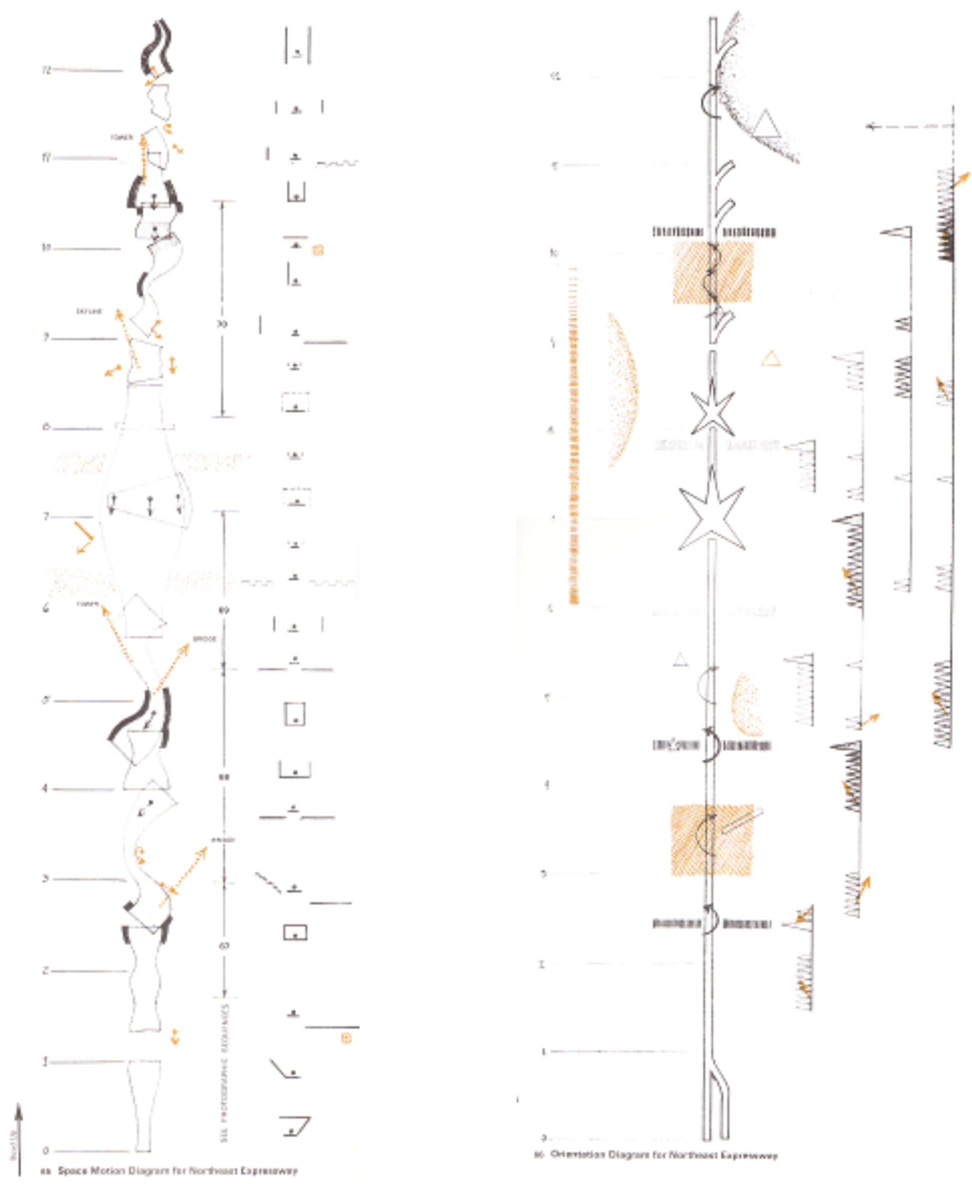


Fig. 0.1 (same as figs. 4.13-4.14), Space Motion and Orientation notation diagrams of Northeast Expressway
Both in: Appleyard et. al., *The View from the Road*, 1964

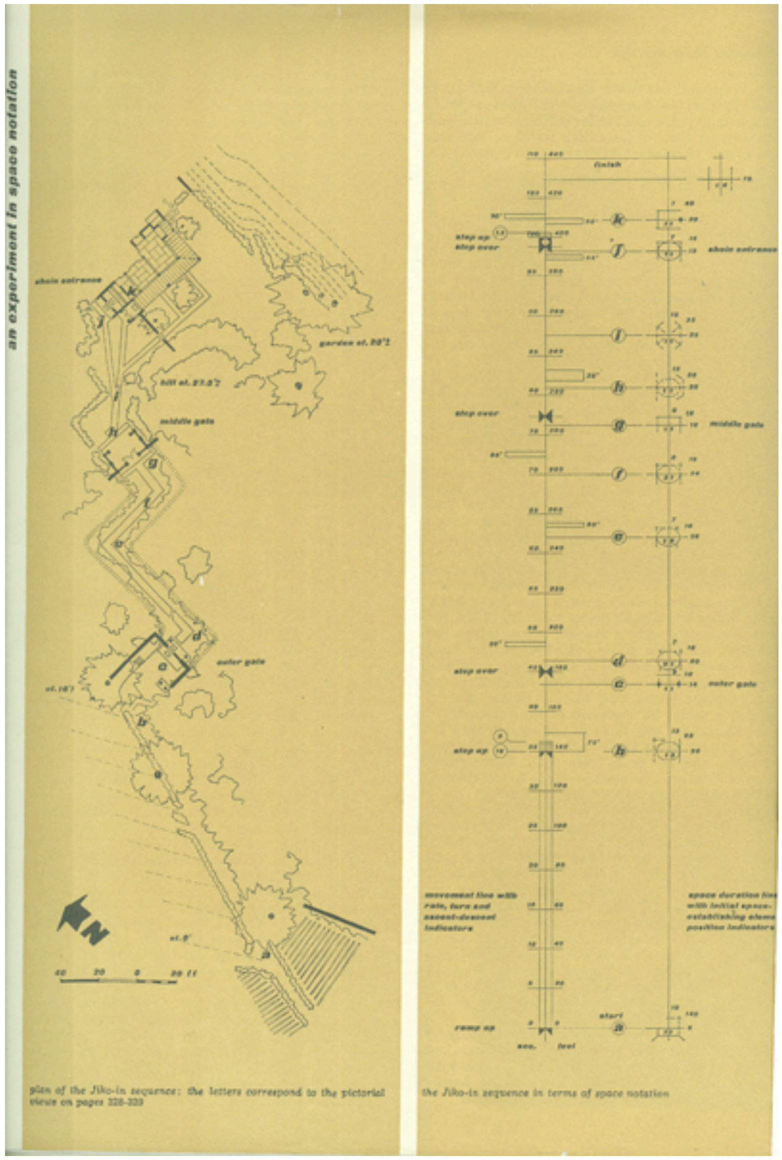


Fig. 0.2 (same as fig. 3.10), Notation keyed to overall plan showing route taken
In: Thiel, "An Experiment in Space Notation," 1962

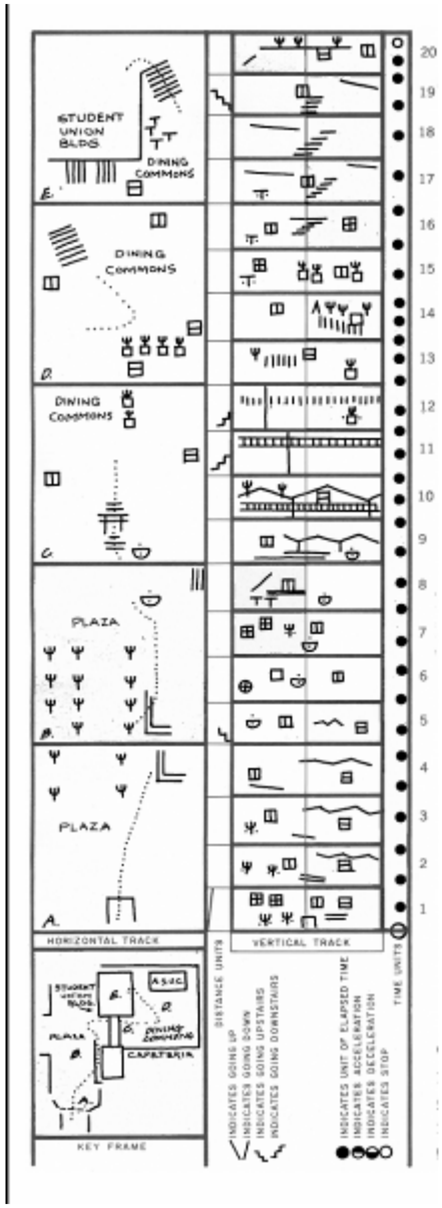


Fig. 0.3 (same as fig. 5.4), Lawrence Halprin, “Motation,” *Progressive Architecture*, July 1965
Showing key frame & horizontal track in the left column and vertical track in the right column

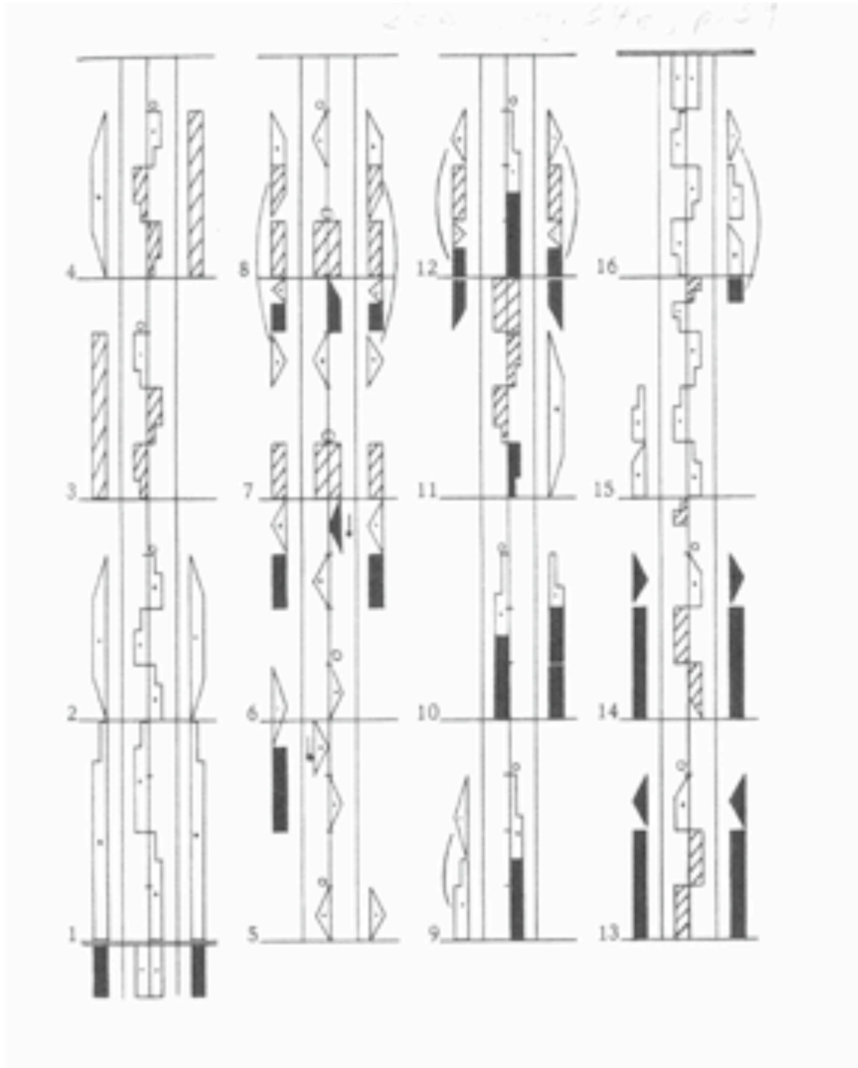


Fig. 0.4, Labanotation
In: Hutchinson, *Labanotation: The System for Recording Movement*, 1954

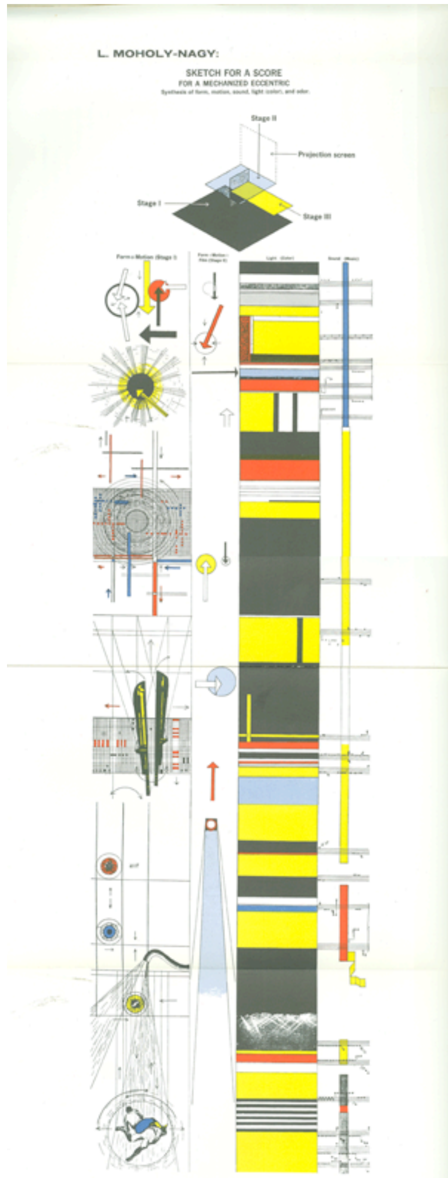


Fig. 0.5, Laszlo Moholy-Nagy, “Sketch of a Score for a Mechanized Eccentric,” 1924
In: Gropius, *The Theater of the Bauhaus*, 1924/1996

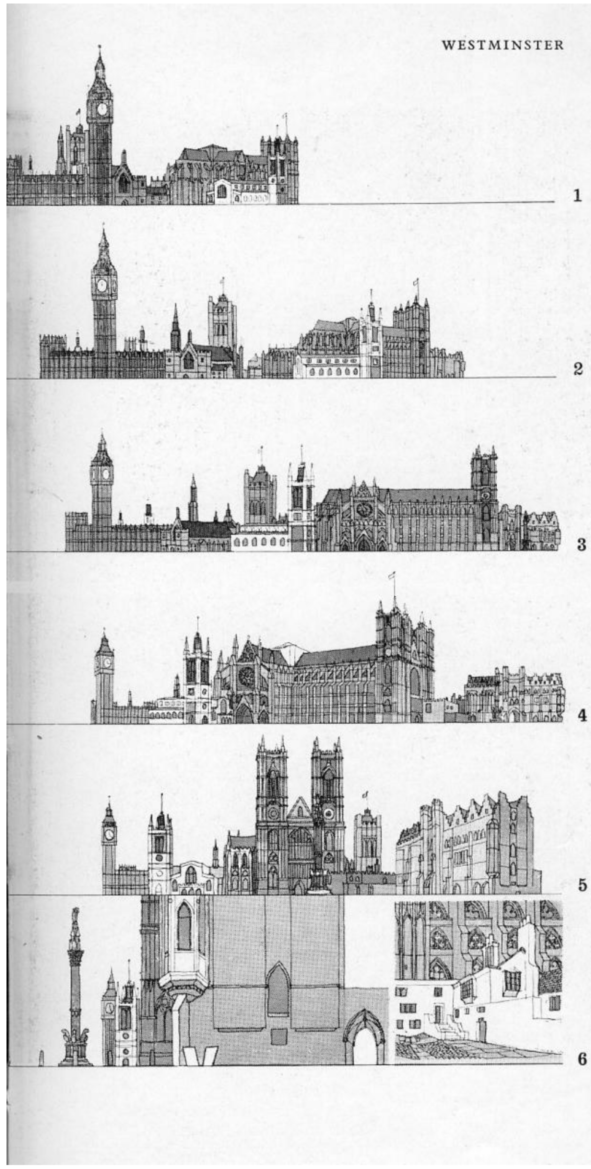


Fig. 0.6, Gordon Cullen, Illustrations of “Serial Vision” during the approach to Westminster
In: Gosling, *Gordon Cullen: Visions of Urban Design*, 1996

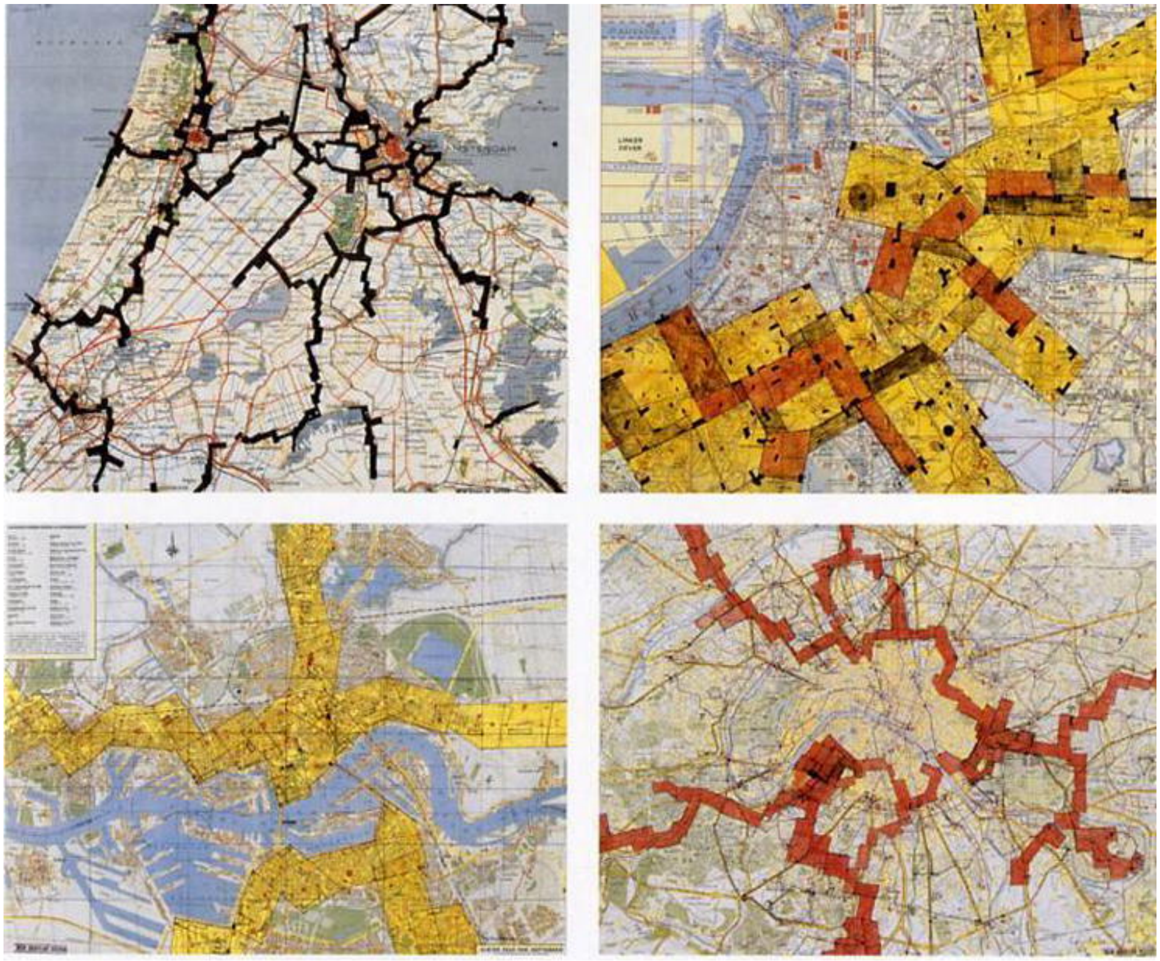


Fig. 0.7, Constant, Four Maps of New Babylon (in Holland, Antwerp, Rotterdam, and Paris)
In: Wigley, *Constant's New Babylon*, 1998

THE

MASTER HIGHWAY PLAN

for the

BOSTON METROPOLITAN AREA

SUBMITTED TO

HIS EXCELLENCY, ROBERT F. BRADFORD

Governor of The Commonwealth of Massachusetts

BY THE

JOINT BOARD FOR THE METROPOLITAN MASTER HIGHWAY PLAN

based upon a TRAFFIC SURVEY *by the*

DEPARTMENT OF PUBLIC WORKS

PUBLIC ROADS ADMINISTRATION, FEDERAL WORKS AGENCY PARTICIPATING

CHARLES A. MAGUIRE AND ASSOCIATES

Consulting Engineers

BOSTON

IN COOPERATION WITH

DE LEUW, CATHER AND COMPANY, CHICAGO

J. E. GREINER COMPANY, BALTIMORE

February 1, 1948

Fig. 1.1, Cover, *The Master Highway Plan for the Boston Metropolitan Area*, 1948

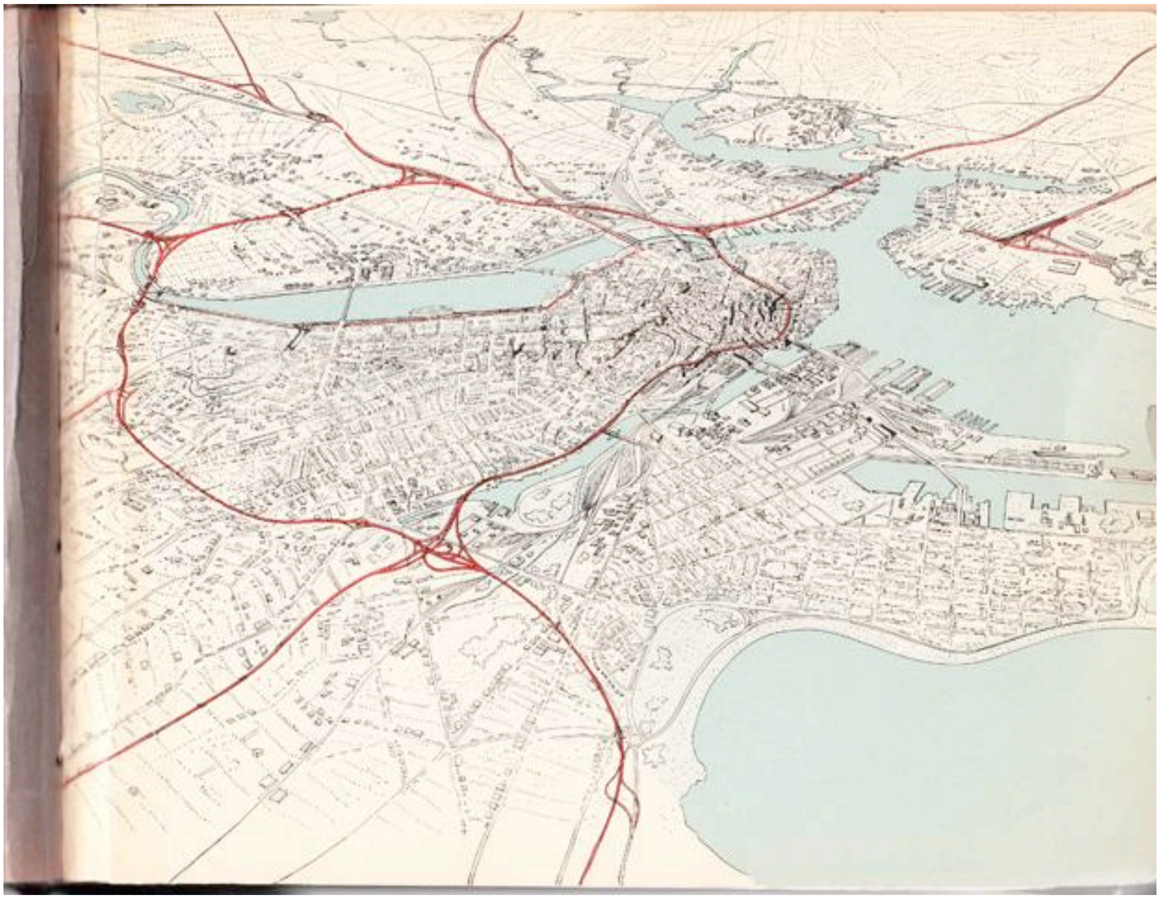


Fig. 1.2, Aerial Perspective of Proposed Inner Belt showing connecting radials
In: *The Master Highway Plan for the Boston Metropolitan Area*, 1948

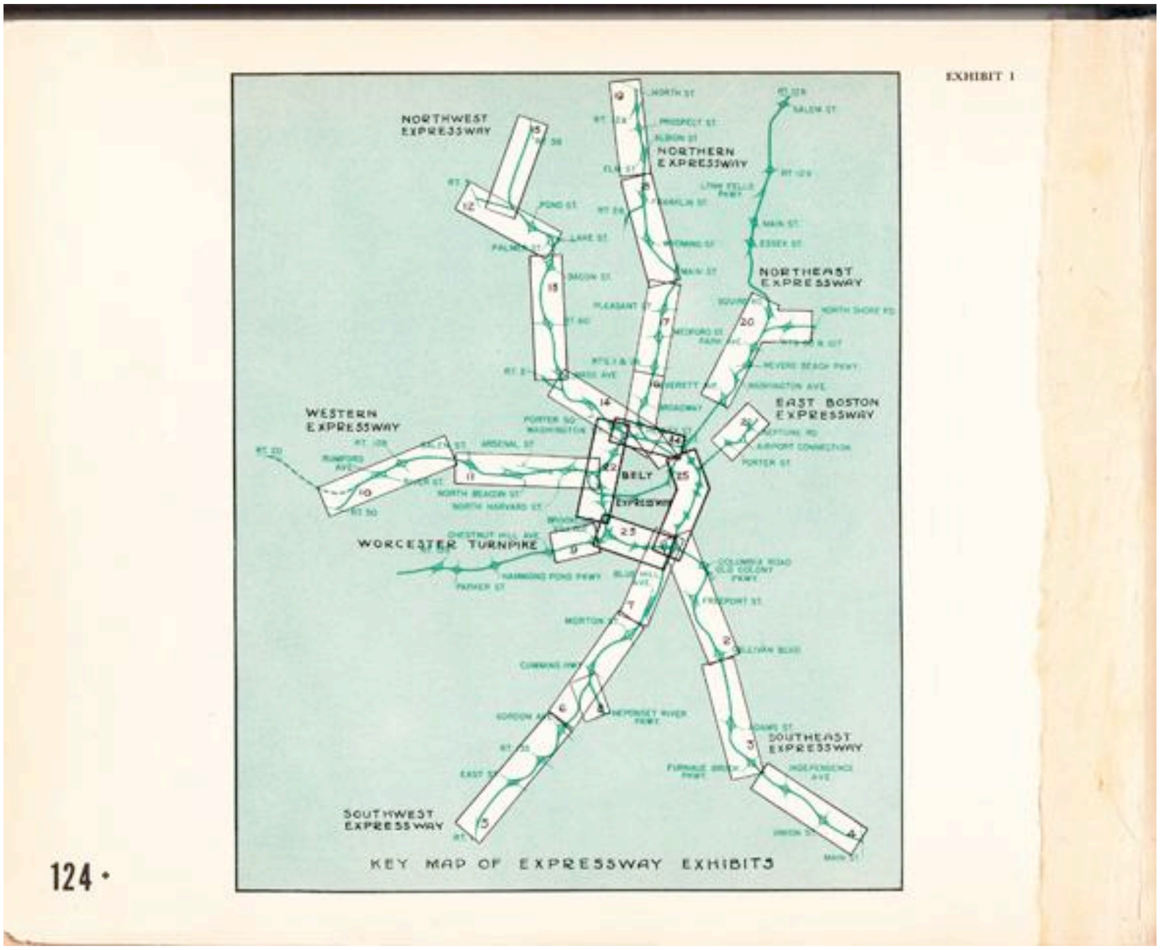


Fig. 1.3, Schematic Diagram showing proposed Inner Belt and locations of major radial highways
In: *The Master Highway Plan for the Boston Metropolitan Area*, 1948

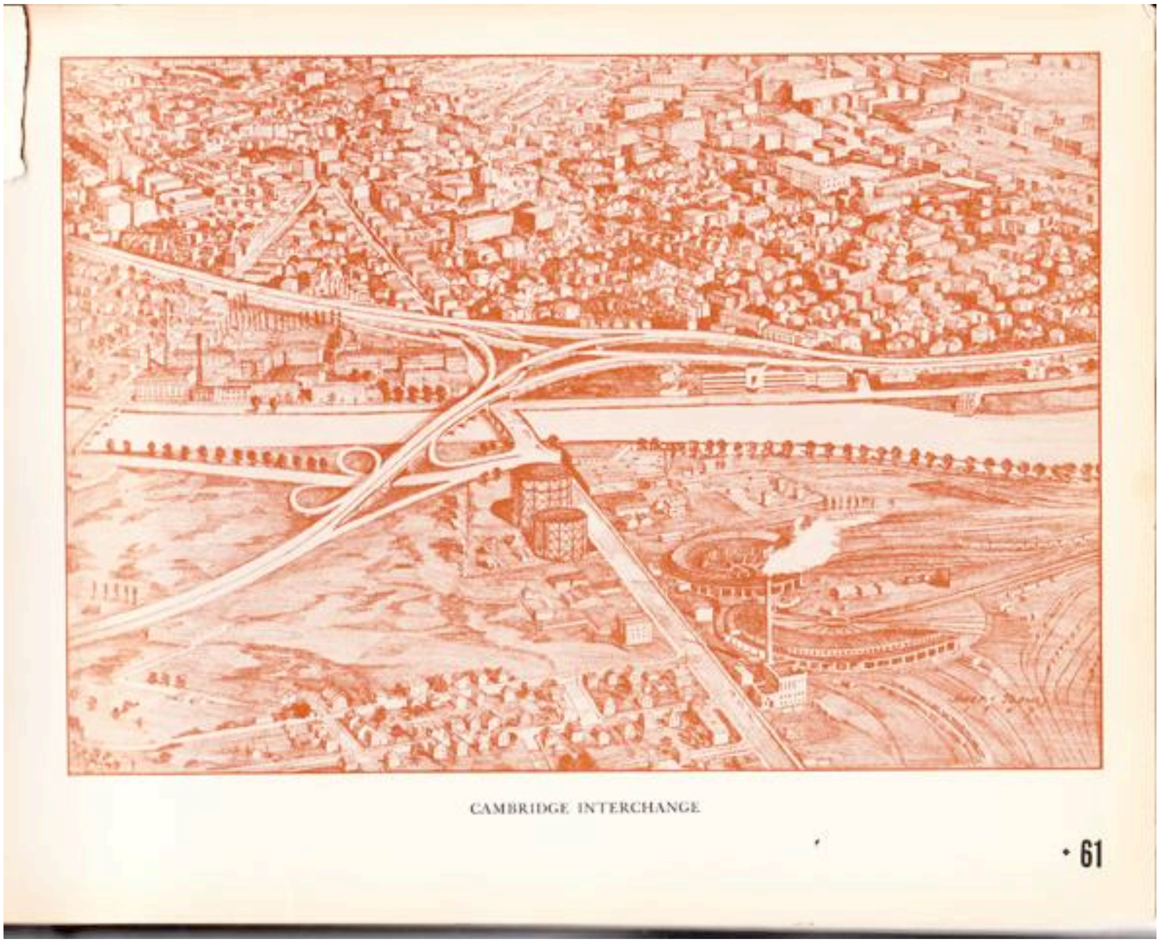


Fig. 1.4, Rendering showing Inner Belt interchange in Cambridge
In: *The Master Highway Plan for the Boston Metropolitan Area*, 1948

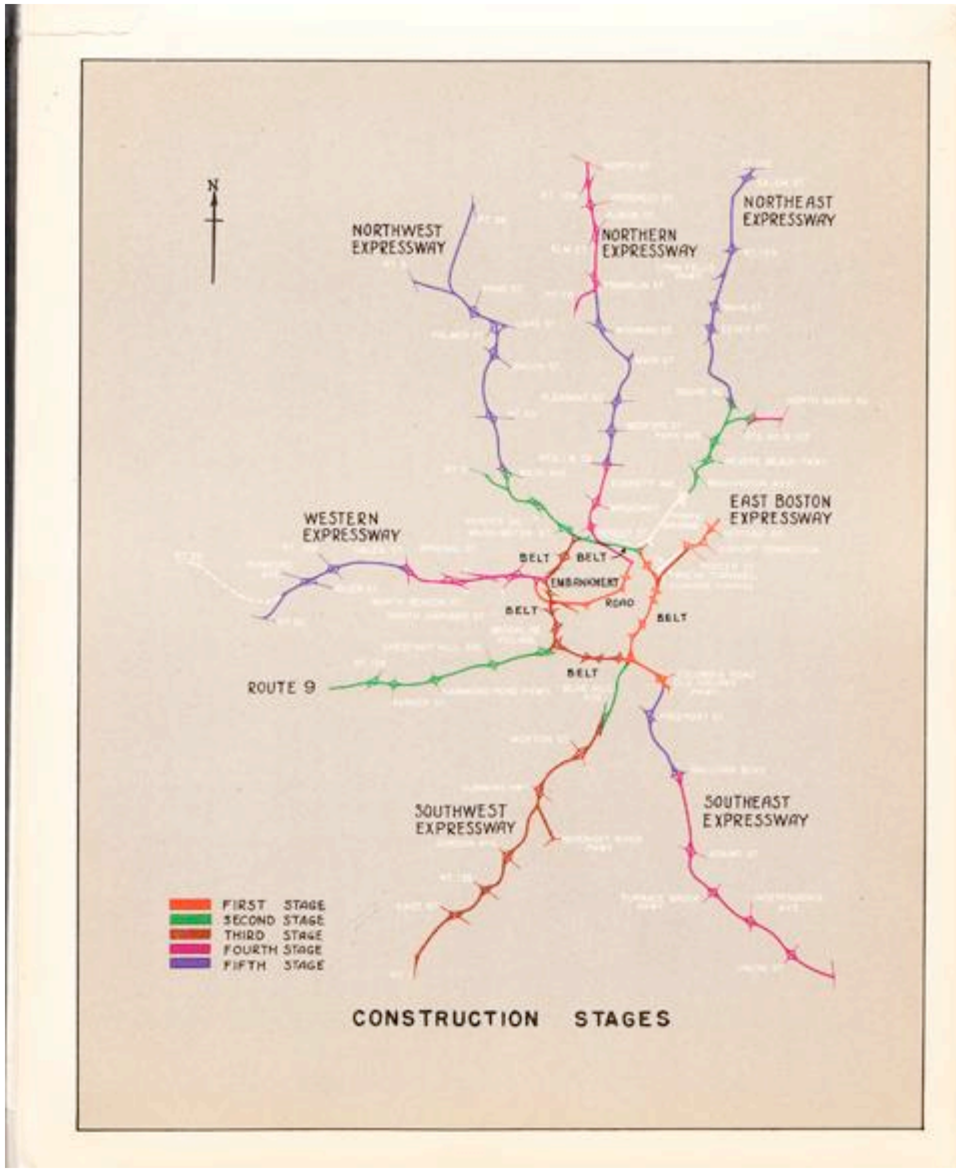
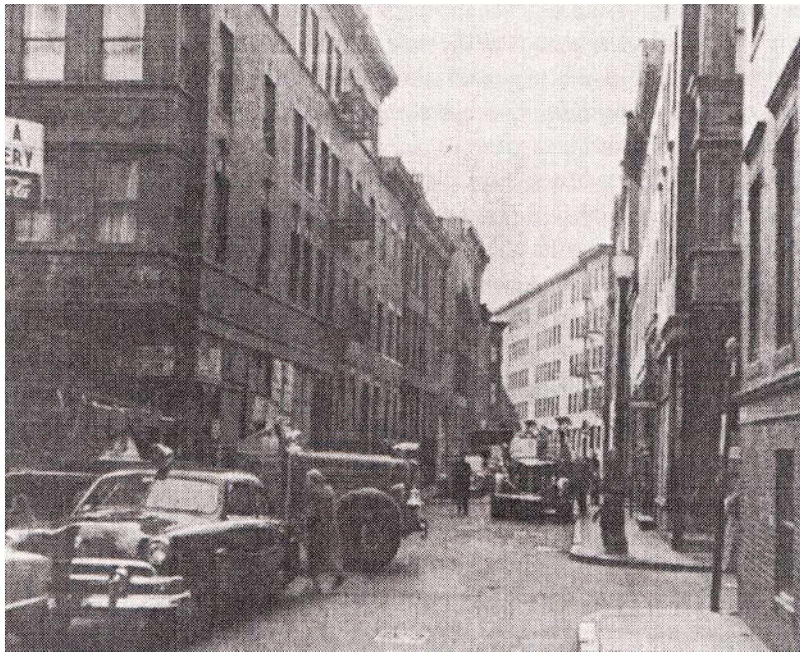


Fig. 1.5, Proposed Construction Stages,
showing priority given to Central Artery (stg. 1) and Inner Belt (stgs. 2-3)
In: *The Master Highway Plan for the Boston Metropolitan Area*, 1948



Figs. 1.6-1.7, Photographs showing the West End before and after demolition
In: O'Connor, *Building a New Boston*, 1995

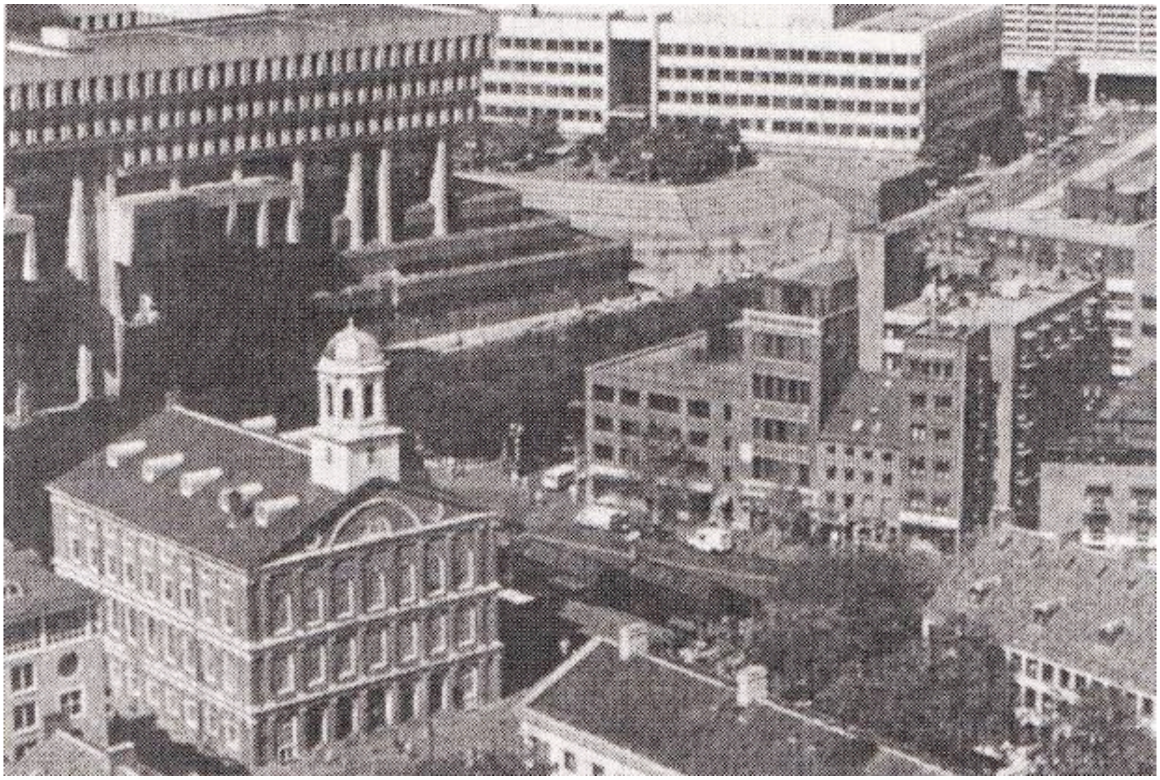


Fig. 1.8, Government Center in Boston
In: O'Connor, *Building a New Boston*, 1995

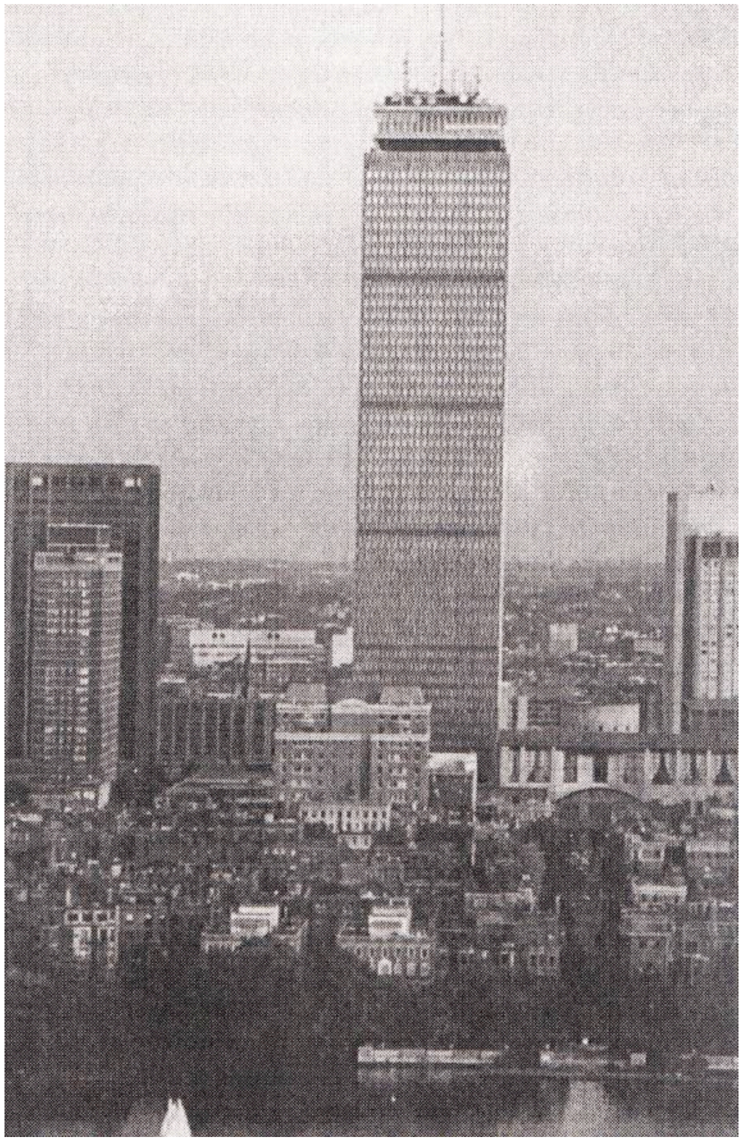
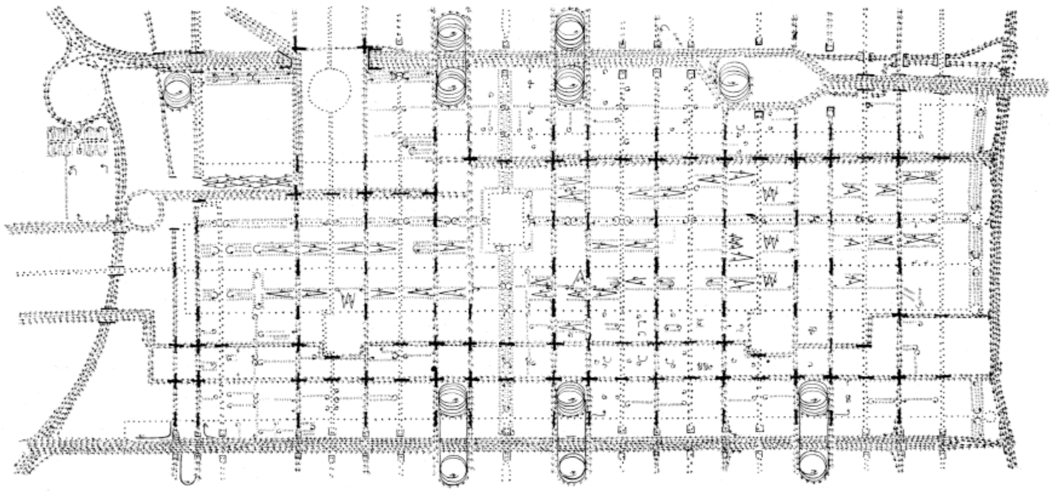
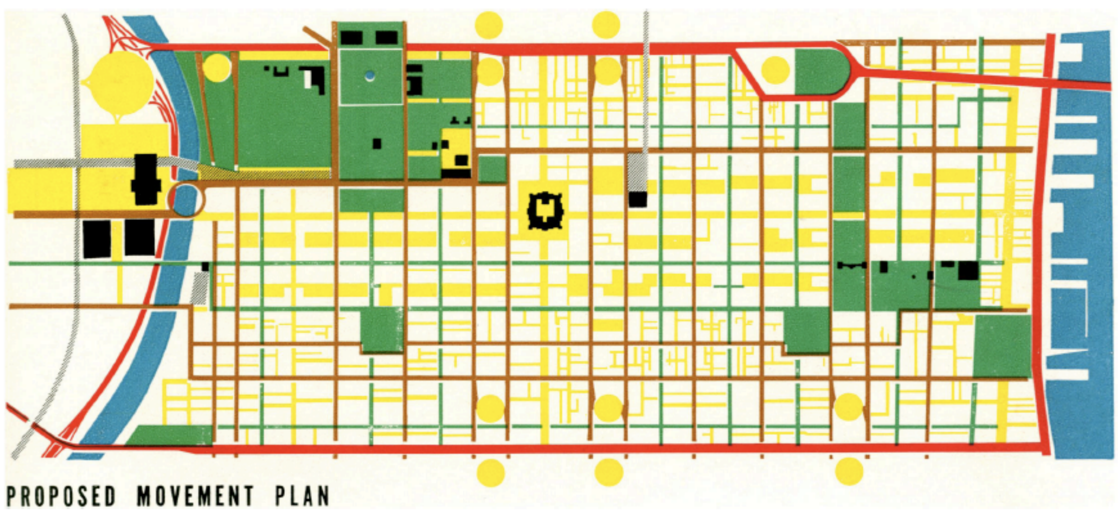


Fig. 1.9, Prudential Tower in Back Bay
In: O'Connor, *Building a New Boston*, 1995





Figs. 1.10-1.11, Proposed Movement Pattern and Plan for Center City Philadelphia
In: Kahn, “Toward a Plan for Midtown Philadelphia,” *Perspecta* 2, 1953

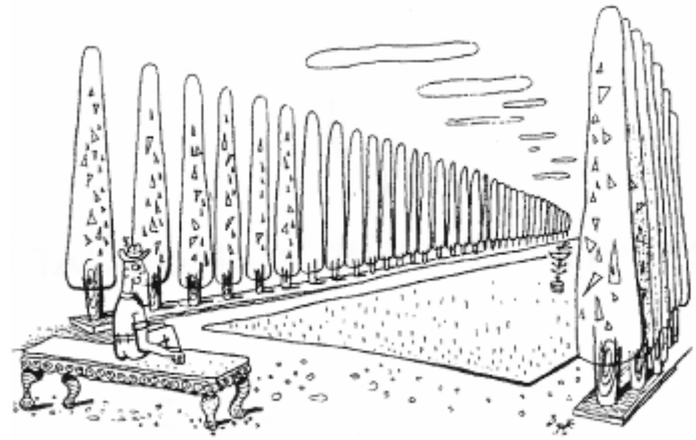


Fig. 1.12, Lawrence Halprin, Illustrations from "Choreography of Gardens, *Impulse* Magazine, 1949 (Reproduced from Halprin, "Choreography in the Landscape," *Student Publication of the North Carolina School of Design, North Carolina State University*, 1955)

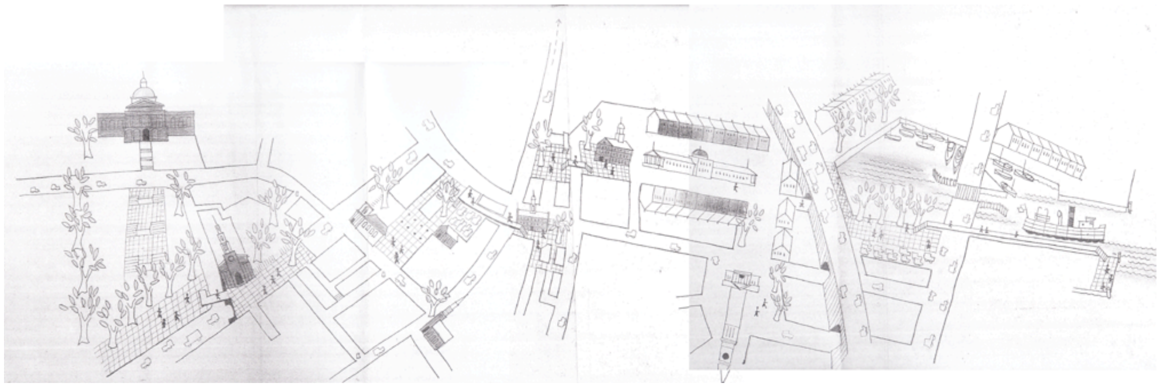


Fig. 1.13, Concept Map showing area of study
In: Thiel, “An Urban Visual Redevelopment,” 1952

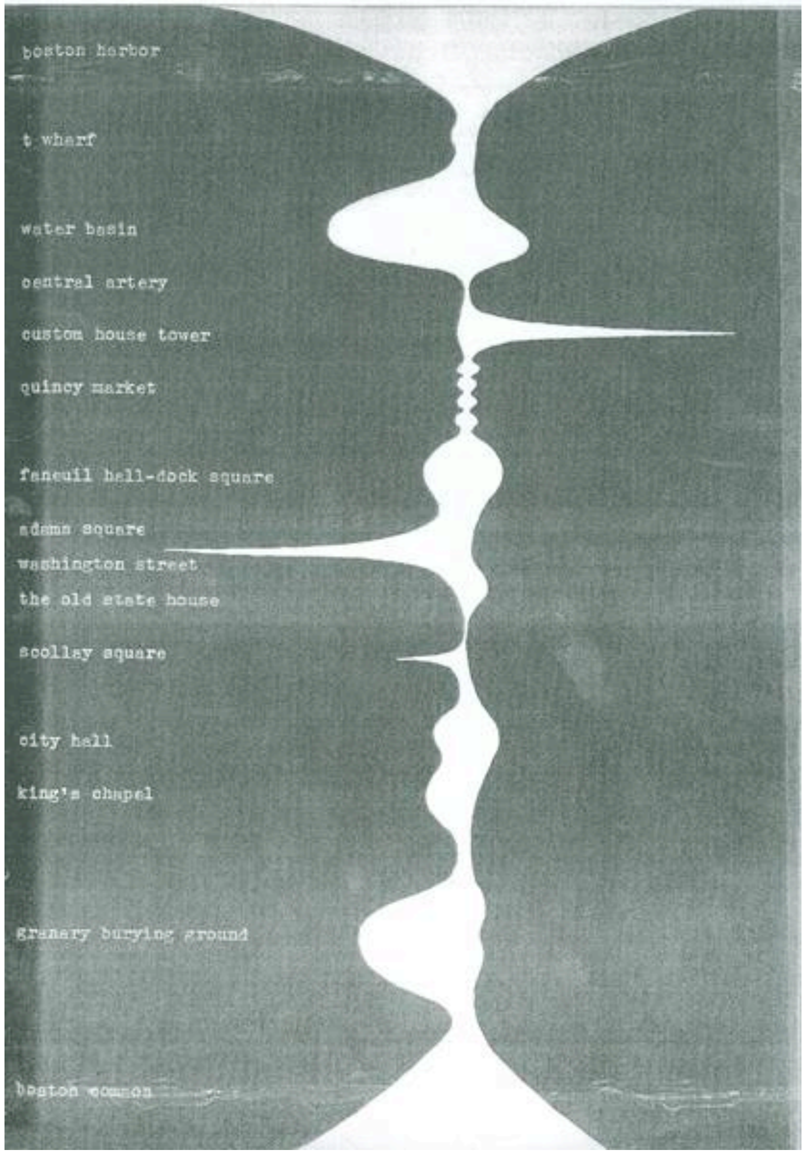


Fig. 1.14, Sequence Summary
In: Thiel, “An Urban Visual Redevelopment,” 1952

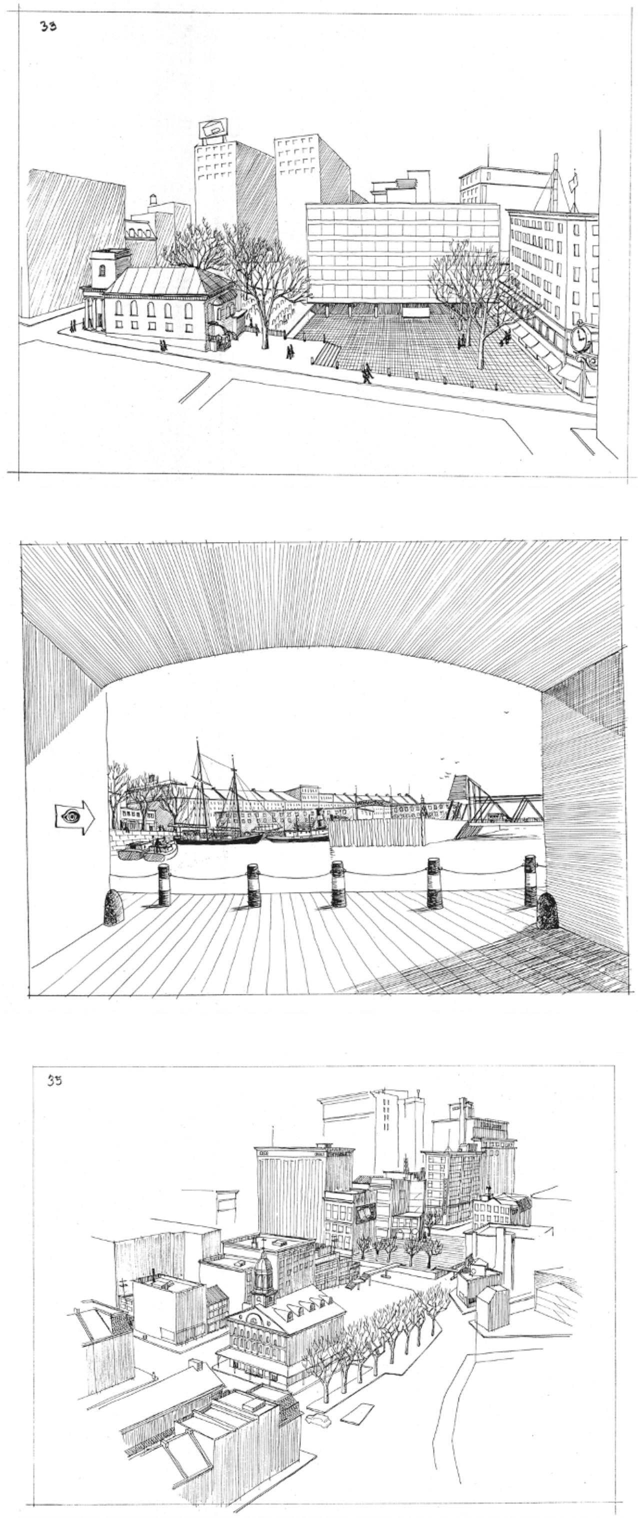


Fig. 1.15, Sketches from viewpoints along area of study, showing proposed changes
In: Thiel, "An Urban Visual Redevelopment," 1952

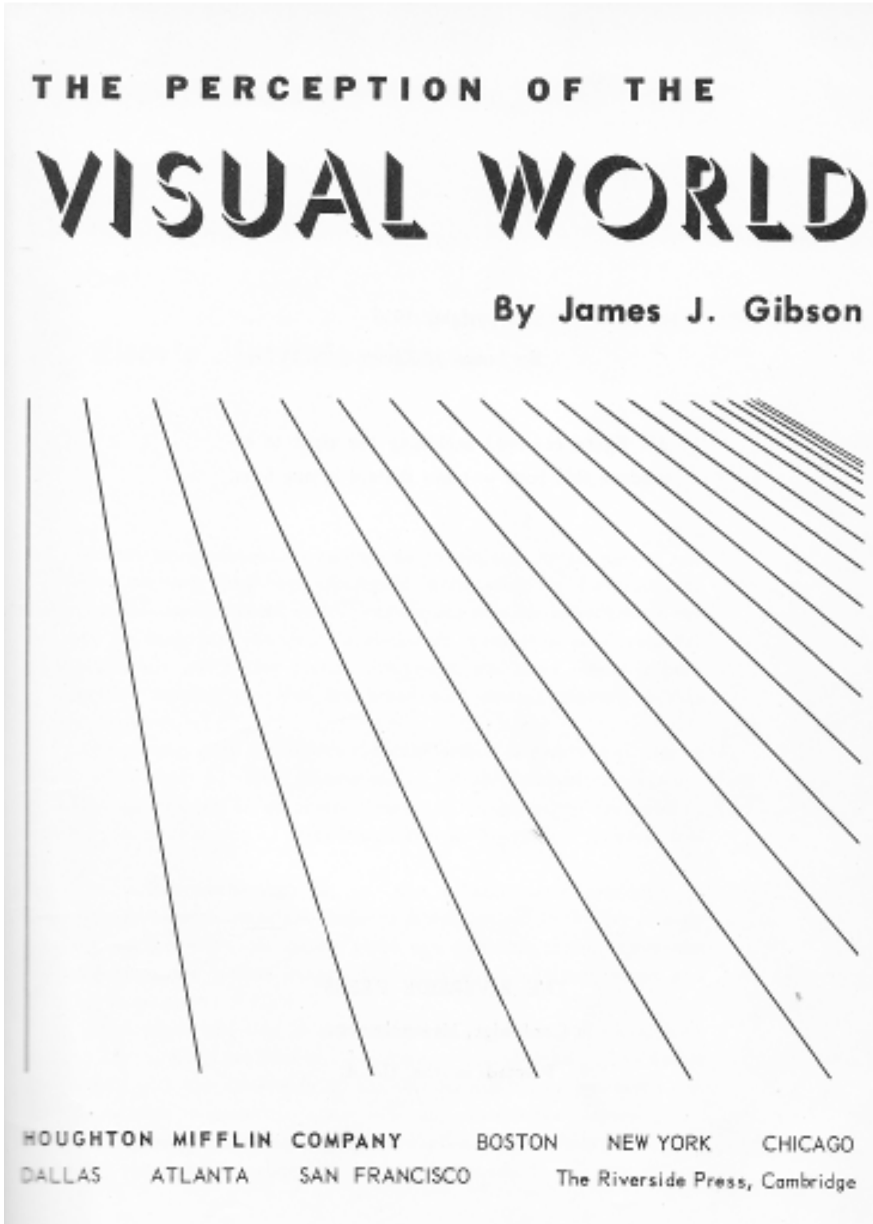
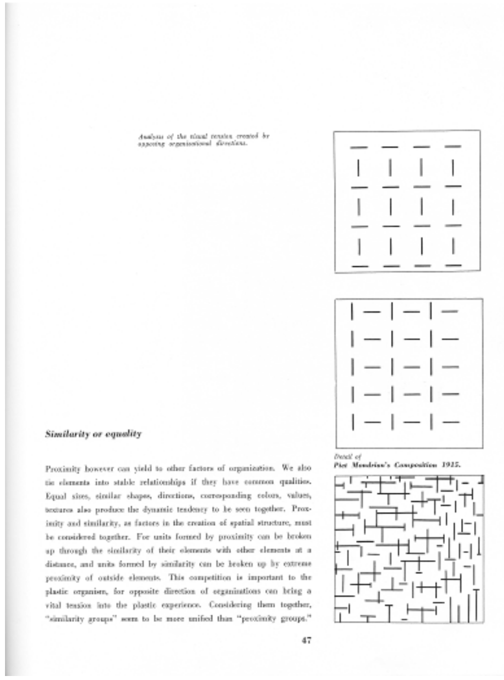


Fig. 1.16, Gibson, Inside cover of *The Perception of the Visual World*, 1950



Analysis of the visual tension created by opposing organizational directions.

Similarity or equality

Proximity however can yield to other factors of organization. We also tie elements into stable relationships if they have common qualities. Equal sizes, similar shapes, directions, corresponding colors, values, textures also produce the dynamic tendency to be seen together. Proximity and similarity, as factors in the creation of spatial structure, must be considered together. For units formed by proximity can be broken up through the similarity of their elements with other elements at a distance, and units formed by similarity can be broken up by extreme proximity of outside elements. This competition is important to the plastic organism, for opposite direction of organizations can bring a vital tension into the plastic experience. Considering them together, "similarity groups" seem to be more unified than "proximity groups."

Detail of
Piet Mondrian's Composition 1925.

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Theo Van Doesburg. Painting
Courtesy of The Museum of Modern Art

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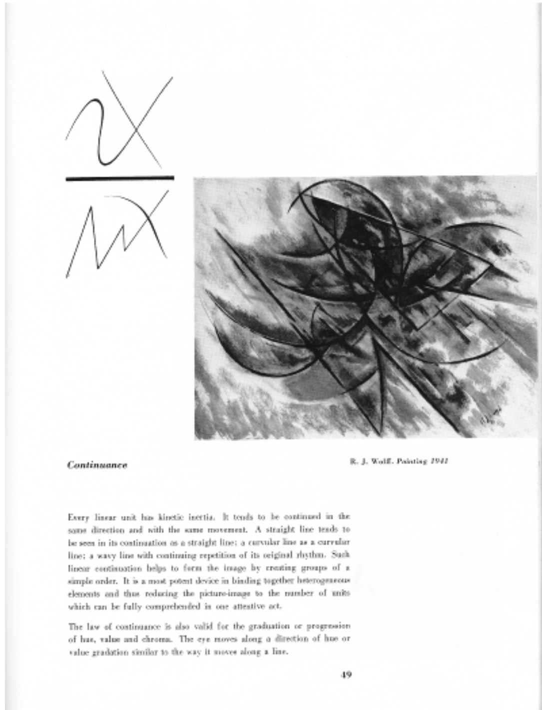
Figs. 1.17-1.18, Full page spreads from Kepes, *The Language of Vision*, 1944
showing illustrations taken from Mondrian and van Doesburg to illustrate the principle of Similarity or Equality



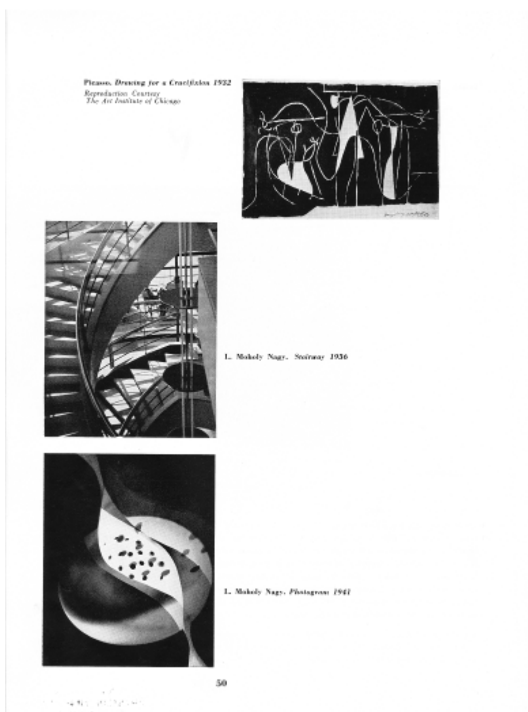
Continuance

R. J. Wolff. Painting *1941*

Every linear unit has kinetic inertia. It tends to be continued in the same direction and with the same movement. A straight line tends to be seen in its continuation as a straight line; a curvular line as a curvular line; a wavy line with continuing repetition of its original rhythm. Such linear continuation helps to form the image by creating groups of a simple order. It is a most potent device in binding together heterogeneous elements and thus reducing the picture-image to the number of units which can be fully comprehended in one attentive act.

The law of continuance is also valid for the graduation or progression of hue, value and chroma. The eye moves along a direction of hue or value gradation similar to the way it moves along a line.

49



Picasso. *Drawing for a Crucifixion 1932*

Reproduction Courtesy
The Art Institute of Chicago

L. Moholy Nagy. *Stairway 1936*

L. Moholy Nagy. *Photogram 1941*

50

Figs. 1.19-1.20, Full page spreads from Kepes, *The Language of Vision*, 1944
showing illustrations taken from Wolff, Picasso and Moholy-Nagy to illustrate the principle of Closure

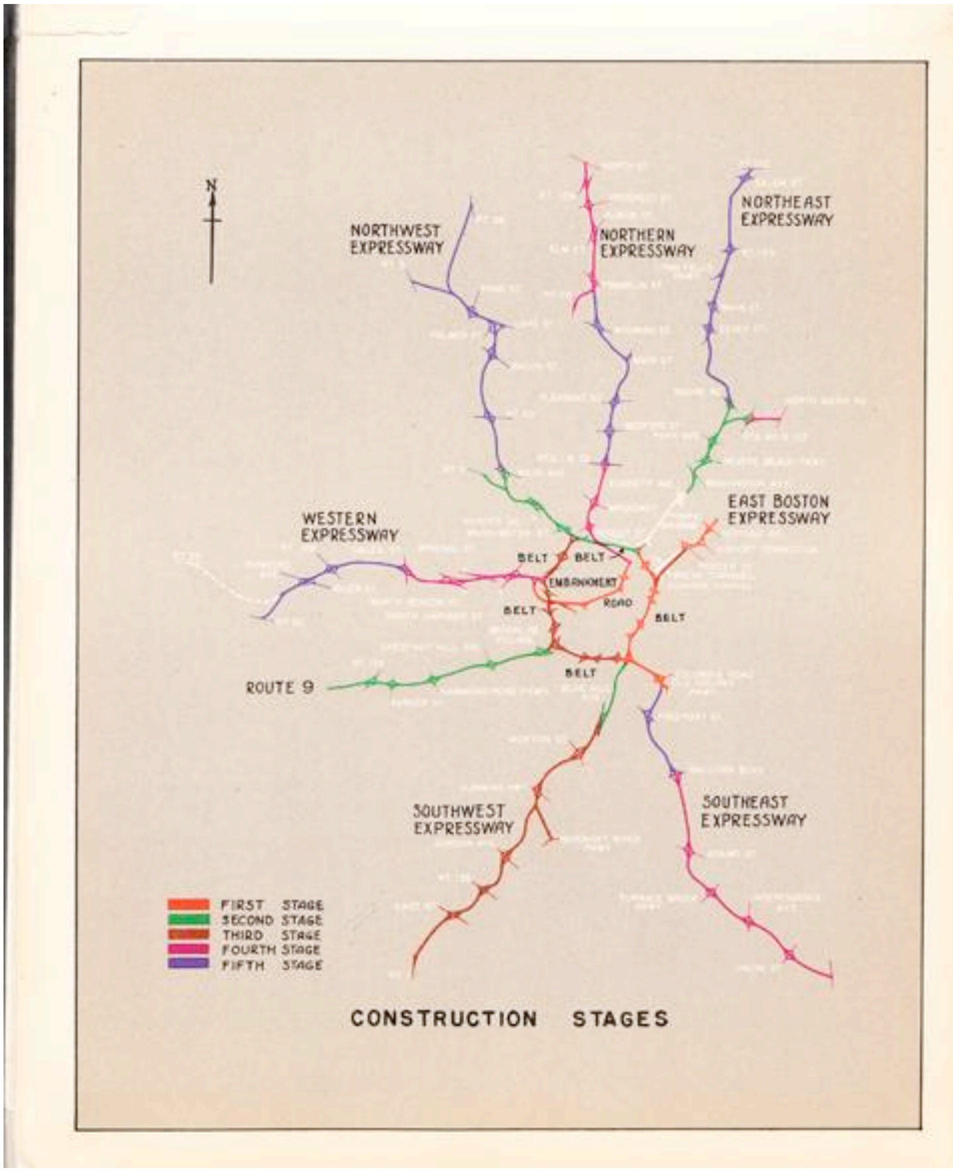


Fig. 2.1, Proposed Construction Stages,
showing priority given to Central Artery (stg. 1) and Inner Belt (stgs. 2-3)
In: *The Master Highway Plan for the Boston Metropolitan Area*, 1948

Fig. 2.2, Map of Northeast Expressway
Published in: Appleyard et. al., *The View from the Road* in 1964 but illustrative of earlier research

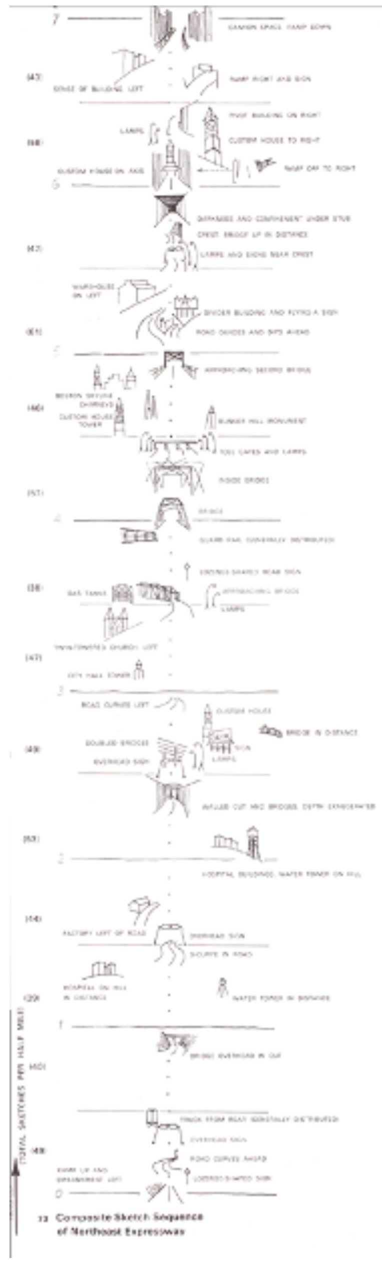


Fig. 2.3, Composite Sketch Sequence of Northeast Expressway
Published in: Appleyard et. al., *The View from the Road* in 1964 but illustrative of earlier research

Fig. 2.4, Sample photographic sequence taken along Northeast Expressway
Published in: Appleyard et. al., *The View from the Road* in 1964 but illustrative of earlier research

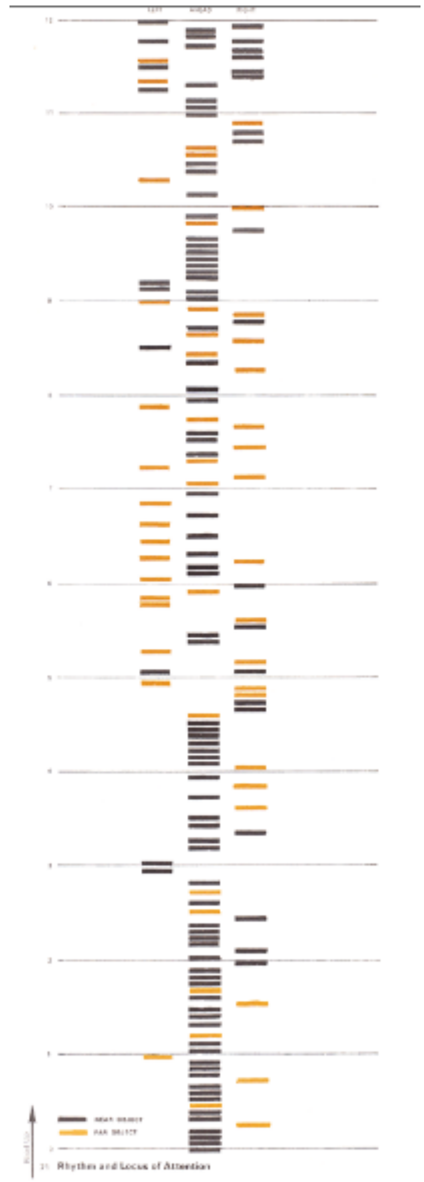


Fig. 2.5, Rhythm and Locus of Attention Diagram along Northeast Expressway
Published in: Appleyard et. al., *The View from the Road* in 1964 but illustrative of earlier research

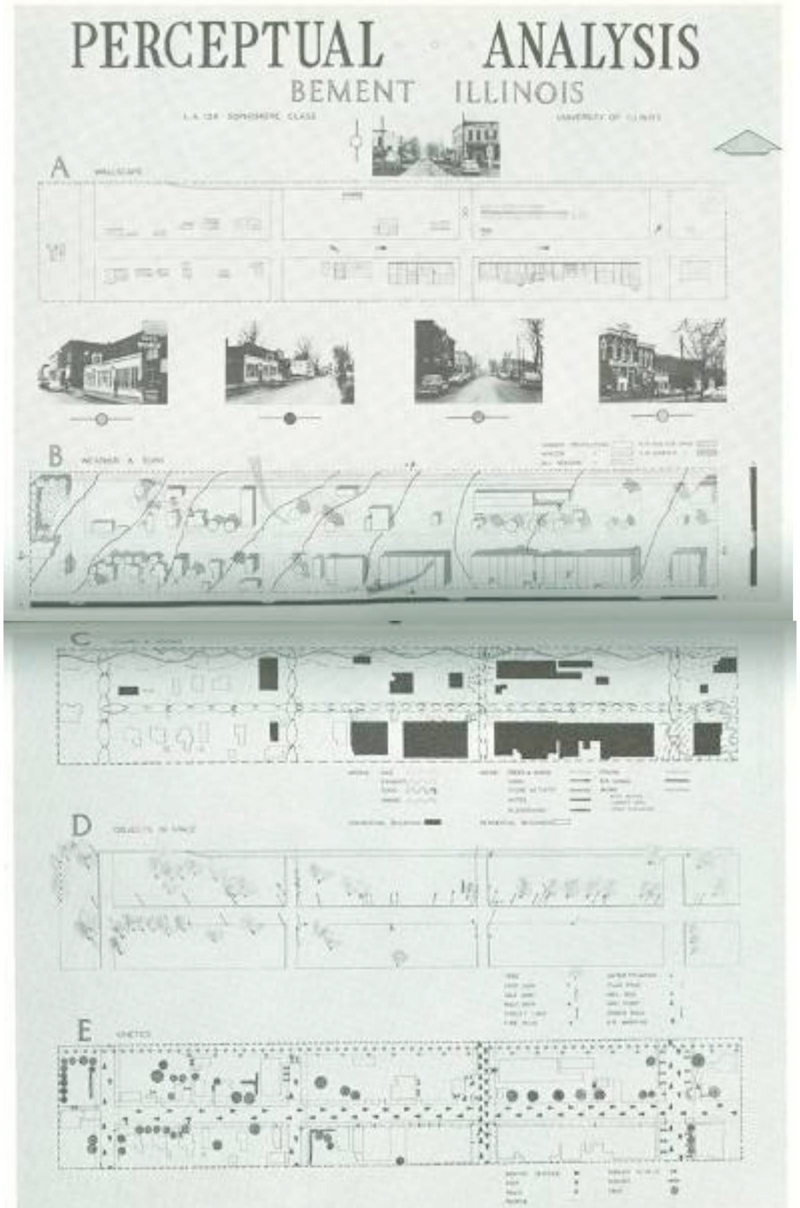


Fig. 2.6, Perceptual Analysis of Bement, Illinois
In: Wetmore, “Visual Approach to Highway Planning and Design,” *Highway Research Board Bulletin*, 1958

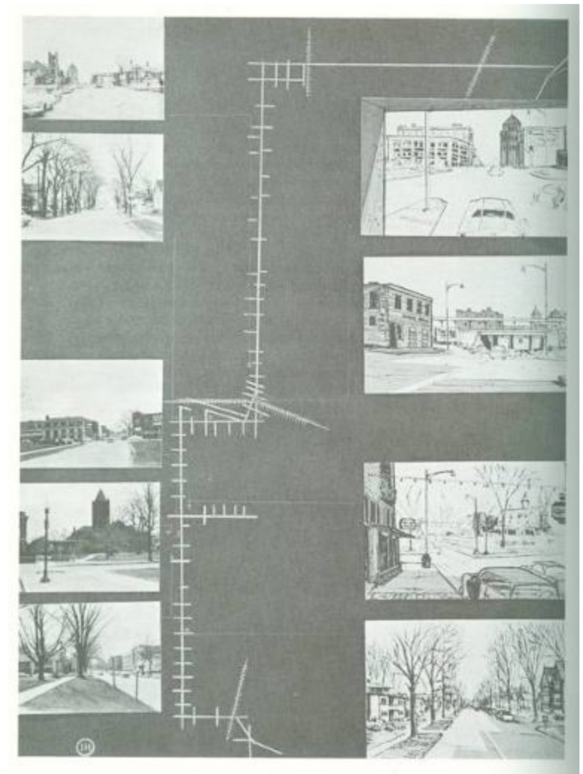


Figure 3.

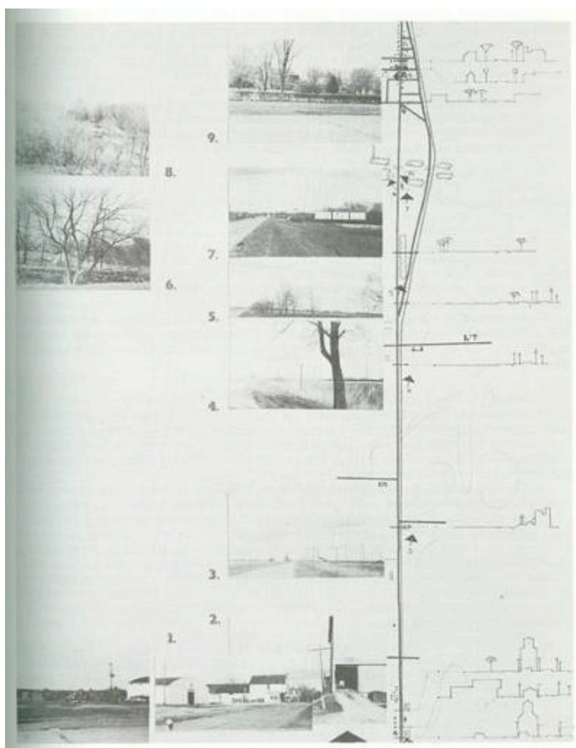
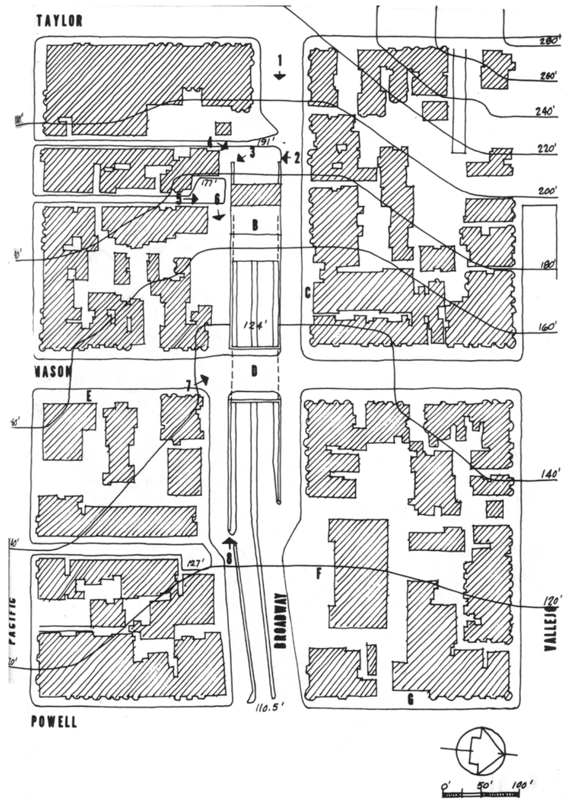
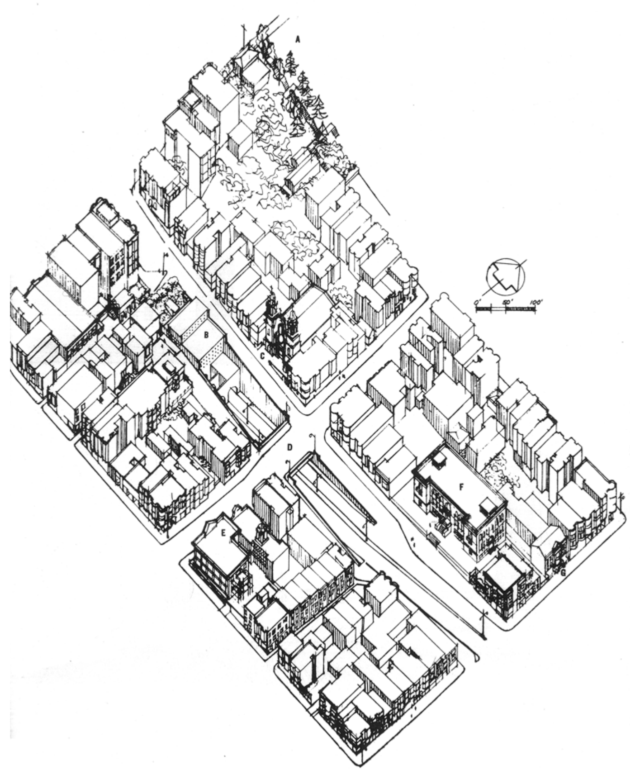


Figure 3. (continued)

Fig. 2.7, Perceptual Analysis of Bement, Illinois
In: Wetmore, “Visual Approach to Highway Planning and Design, ” *Highway Research Board Bulletin*, 1958





Figs. 2.8-2.9, Contour Map and Isometric Perspective of 4-block study area
In: Thiel, “Urban Spaces at Broadway and Mason,” Working Paper, 1959

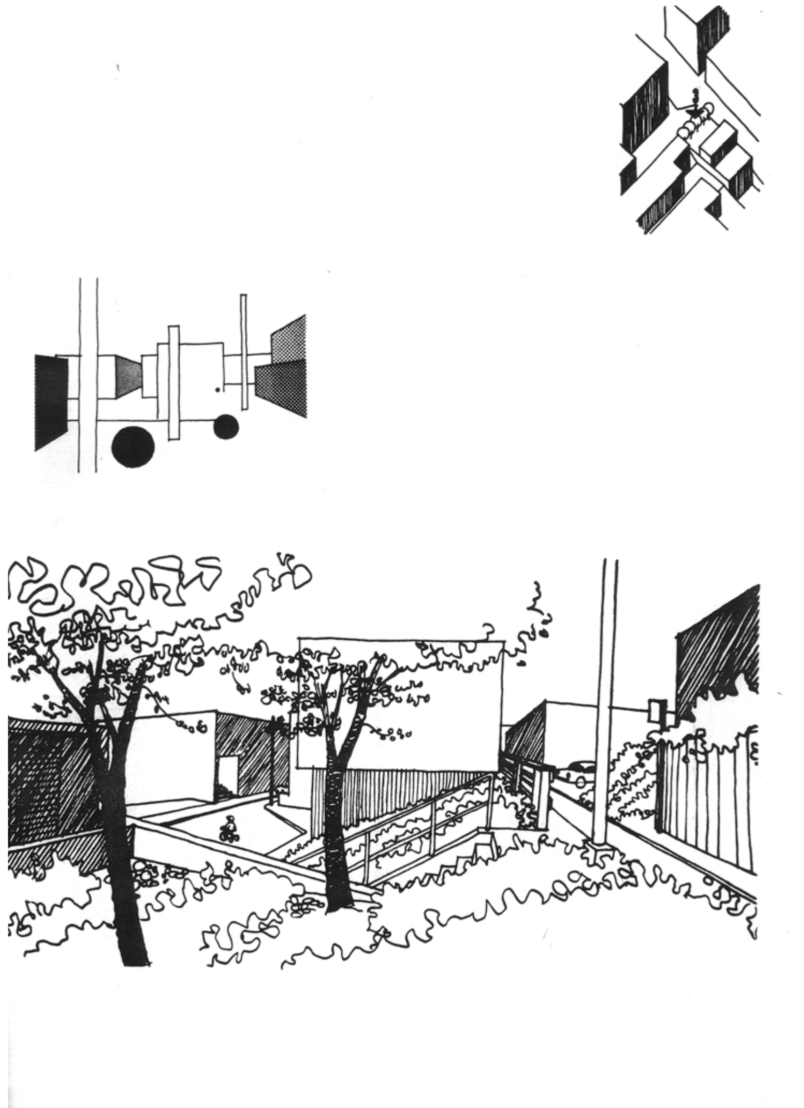


Fig. 2.10, Example of a perspective drawing developed over course of study
In: Thiel, “Urban Spaces at Broadway and Mason,” Working Paper, 1959

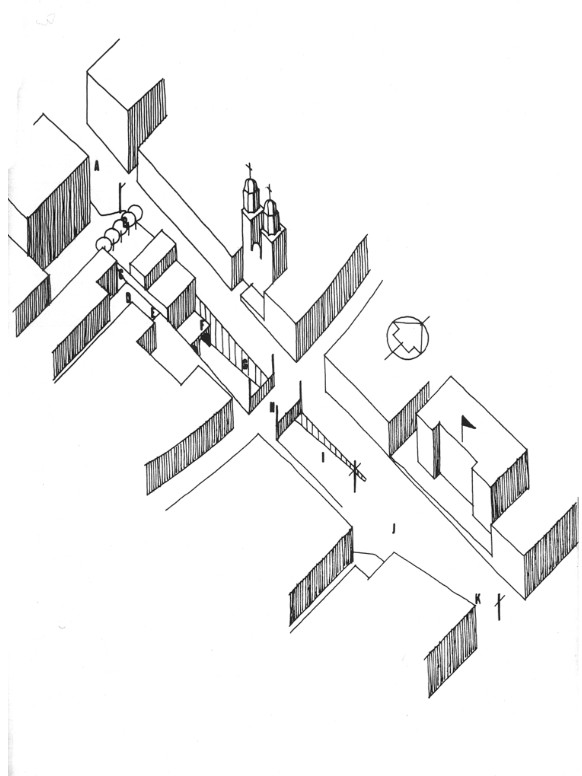


Fig. 2.11: Diagrammatic Isometric drawing of route, showing local spaces
In: Thiel, “Urban Spaces at Broadway and Mason,” Working Paper, 1959

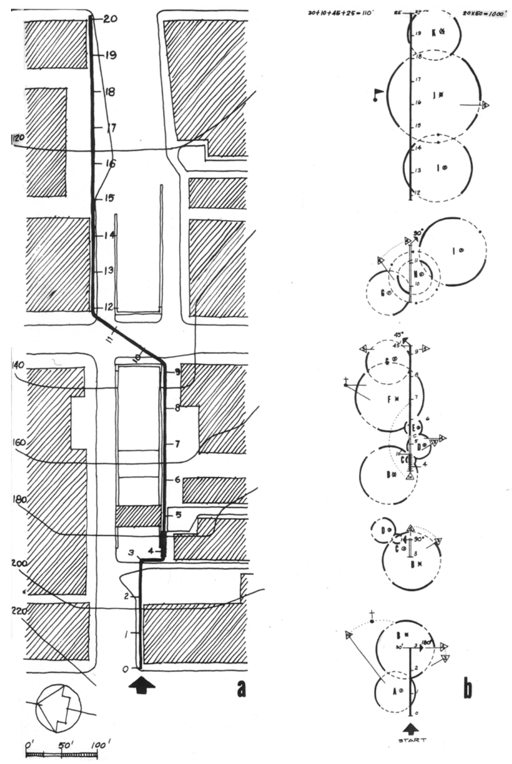


Fig 2.12: Path taken (on left) and notation of route (on right)
In: Thiel, “Urban Spaces at Broadway and Mason,” Working Paper, 1959

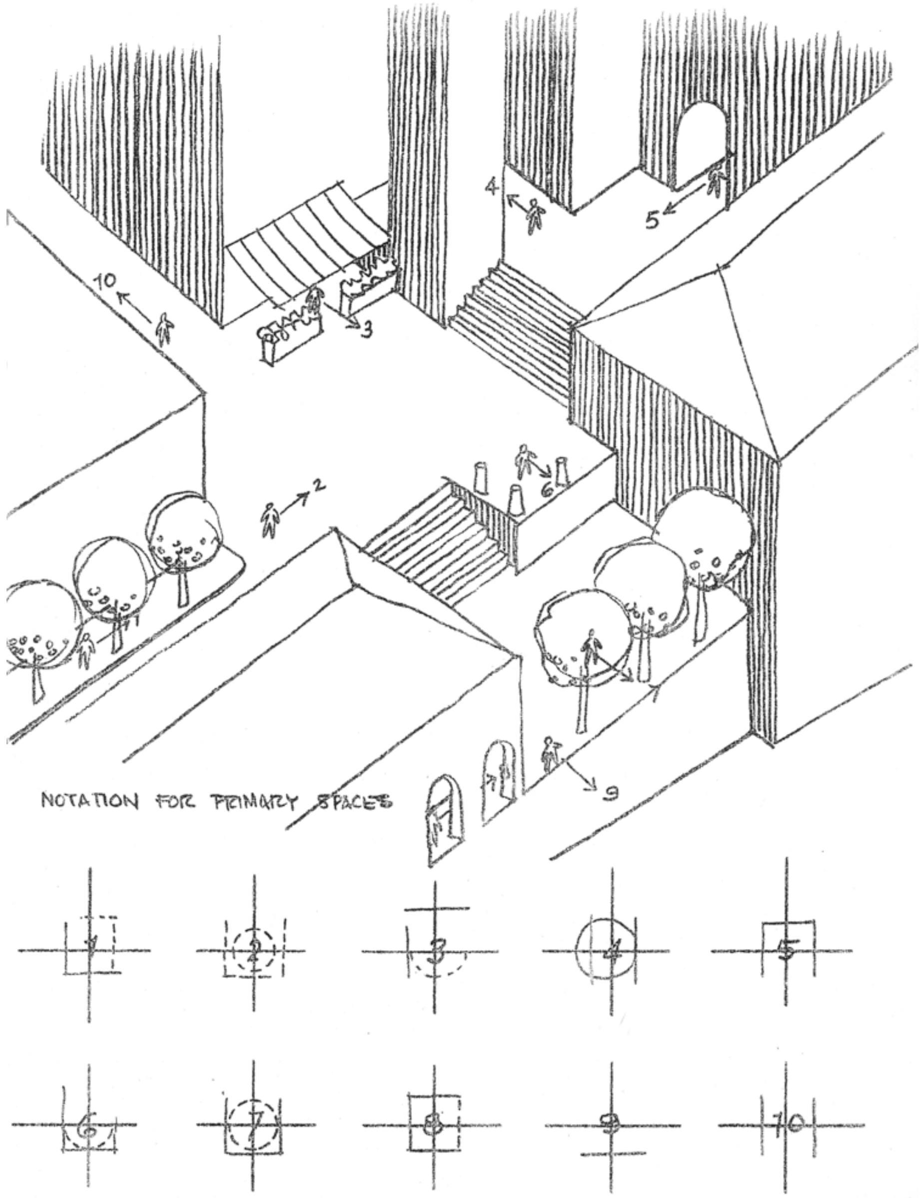


Fig. 2.13, Notation for Primary Spaces
In: Thiel, “A Proposed Space-Notation,” Working Paper, 1959

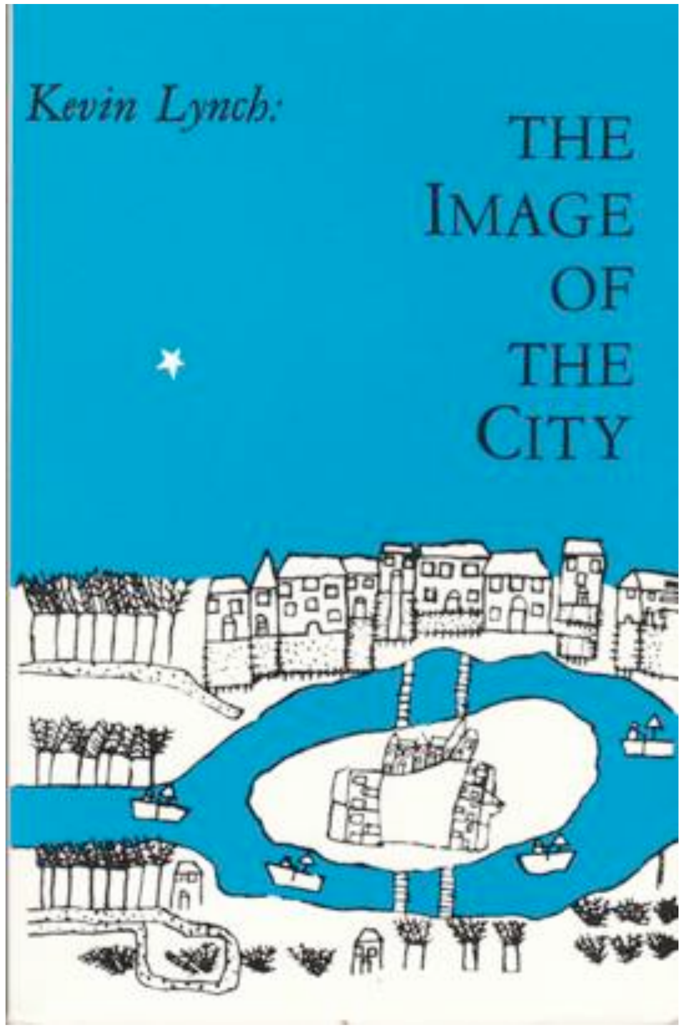


Fig. 2.14, Lynch, Front cover of *The Image of the City*, 1960

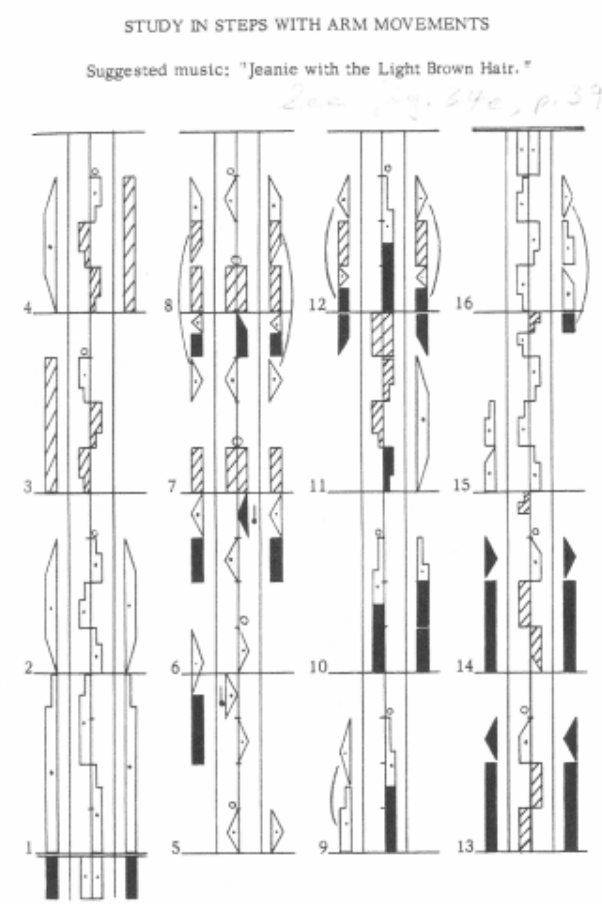
Arbeau: coordination of steps with music.

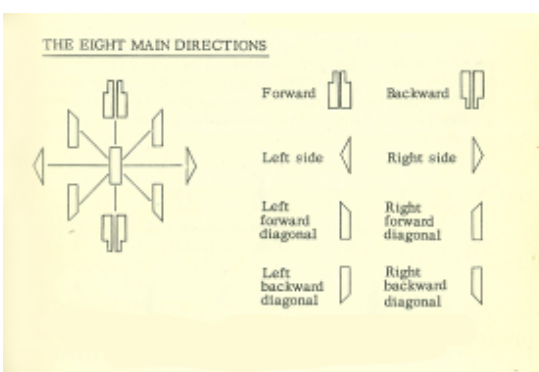
Arbeau, Orchesographie, 1588

Fig. 11.3 Saint-Léon system: excerpt from the Pas de Six from *La Vivandière*.

Saint-Léon, Sténochorégraphie, 1848

Figs. 3.1-3.2, Dance Notations (various) from Ann Hutchinson Guest,
Dance Notation: The Process of Recording Movement on Paper, 1984





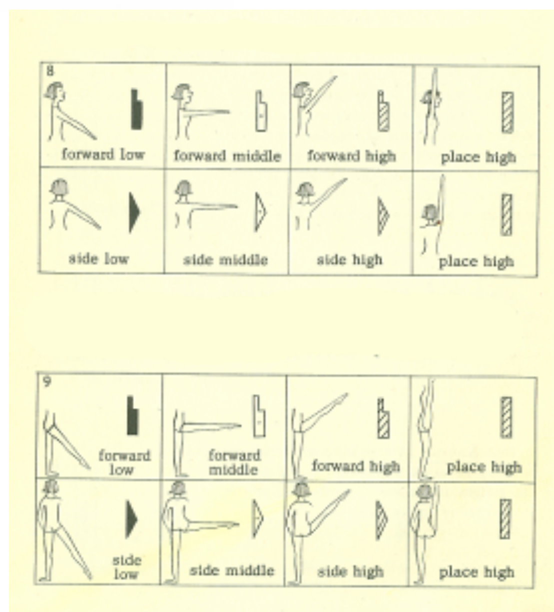


Fig. 3.3, Labanotation, from Hutchinson, *Labanotation: The System for Recording Movement*, 1954
Above: “Study in Steps with Arm Movements,” Below: Notes on Translation

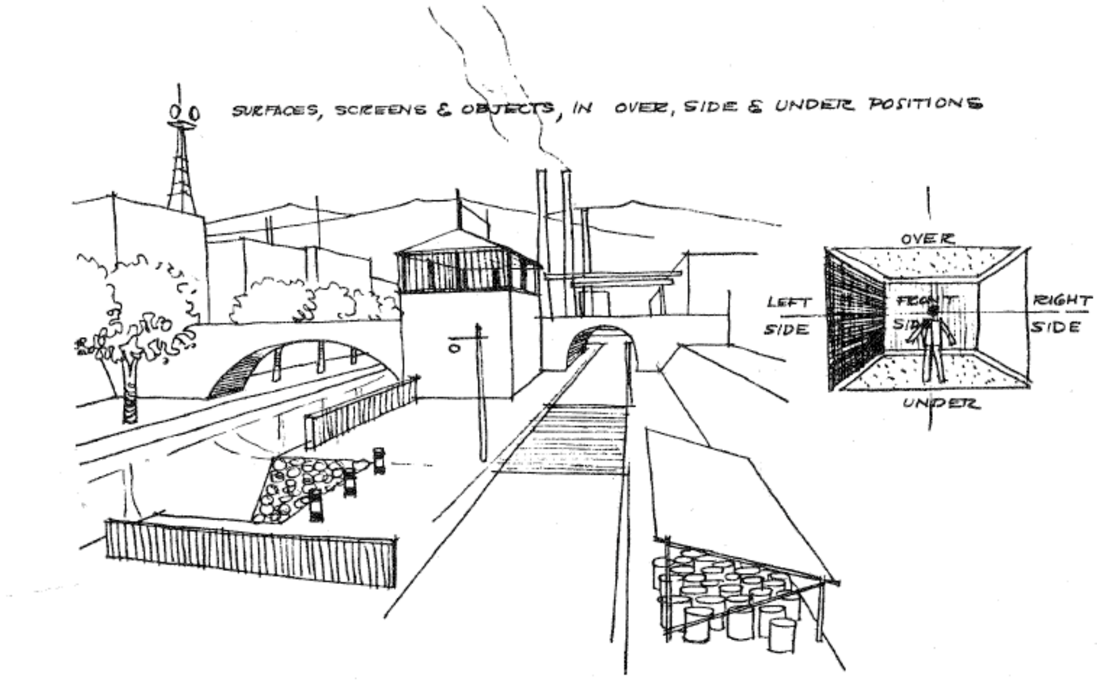


Fig. 3.4, Anatomy of Space: Surfaces, Screens, and Objects
In: Thiel, "Sequence-Experience Notation," *Town Planning Review*, 1961

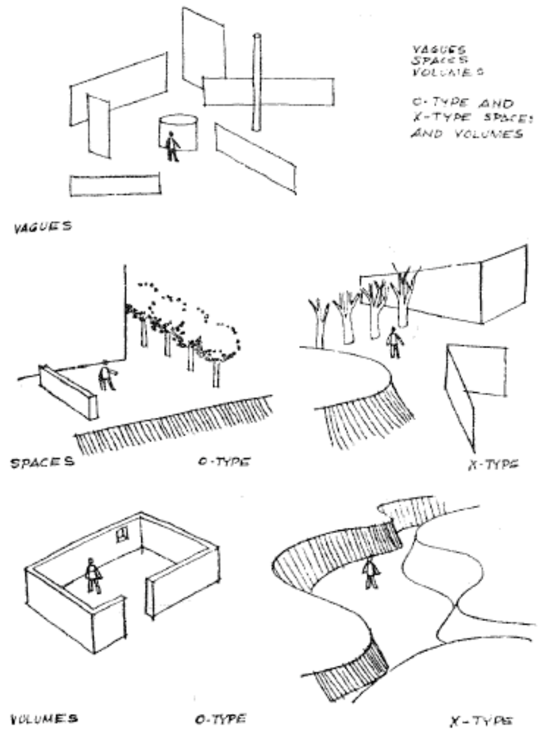


Fig. 3.5, Anatomy of Space: Vagues, Spaces and Volumes
In O-type and X-type configurations
In: Thiel, “Sequence-Experience Notation,” *Town Planning Review*, 1961

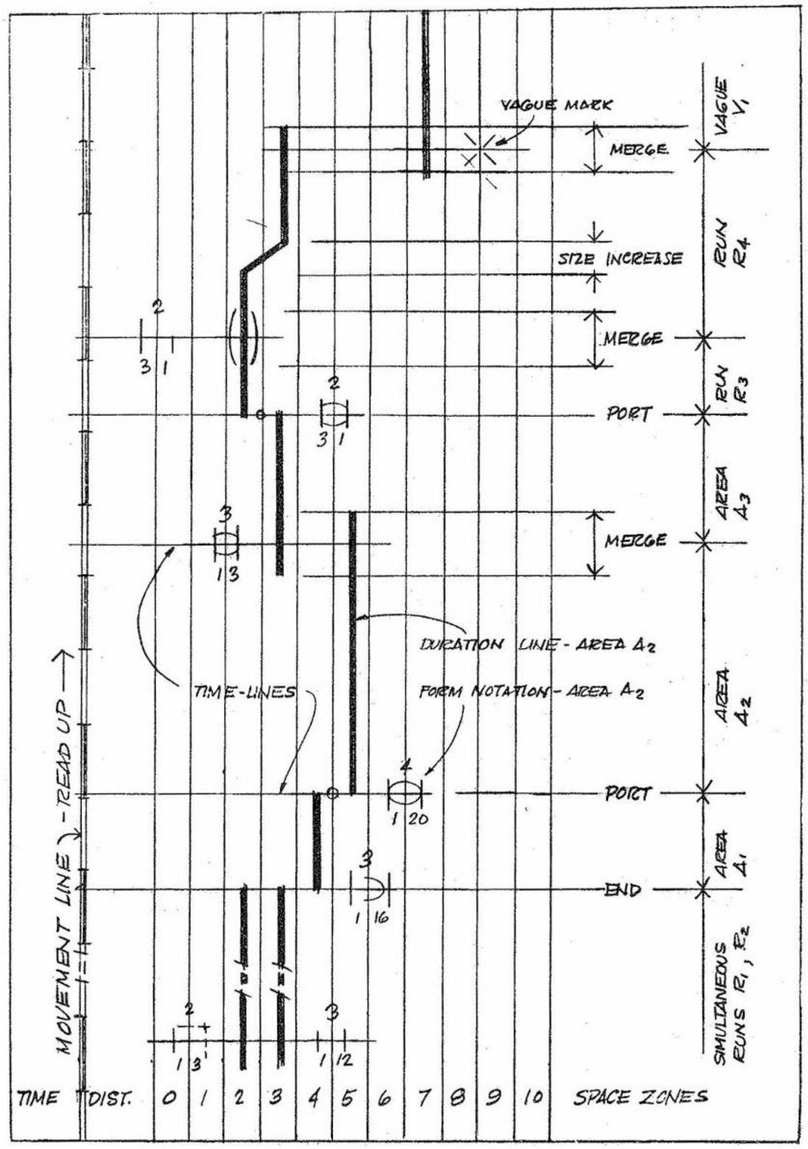
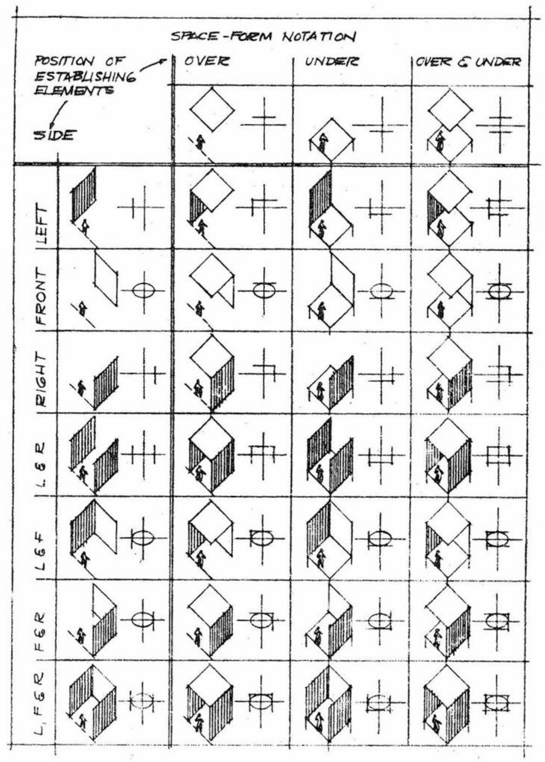


Fig. 3.6, Duration Line and Space-Form Notation
In: Thiel, "Sequence-Experience Notation," *Town Planning Review*, 1961

	Zone Number	*Range Limits (Feet)*	*Remarks*
LOCAL SPACE	0	0–6	minimum habitable space
	1	6–15	conversational space
	2	15–35	
	3	35–80	
	4	80–200	
TRANSITION SPACE	5	200–450	'a common size for successful plazas'
AERIAL SPACE	6	450–1,000	
	7	1,000–2,500	
	8	2,500–6,000	
	9	6,000–15,000	upper limit is horizon distance for a five-foot eye height
	10	15,000 and over	

Fig. 3.7, Space Zones
In: Thiel, "Sequence-Experience Notation," *Town Planning Review*, 1961



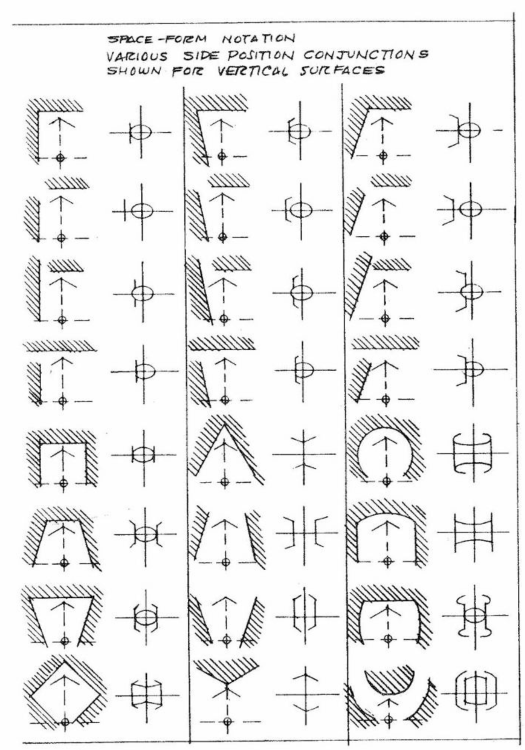
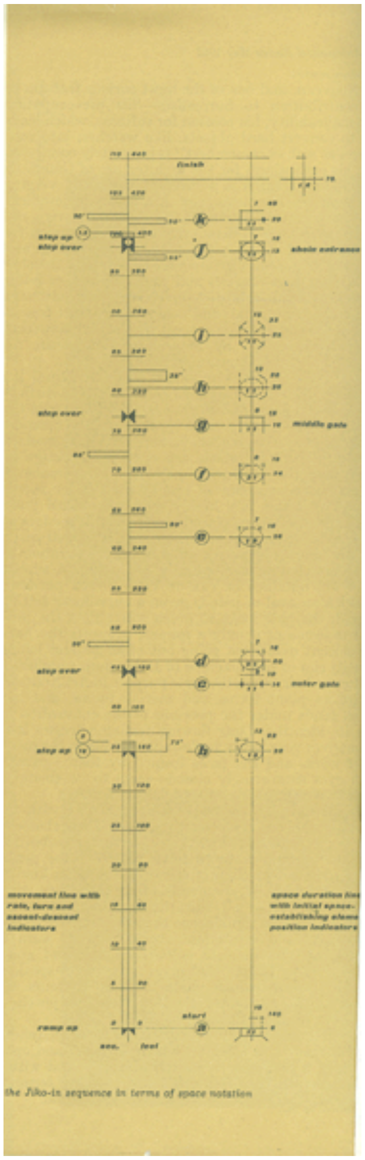


Fig. 3.8, Space-Form Notations
In: Thiel, "Sequence-Experience Notation," *Town Planning Review*, 1961



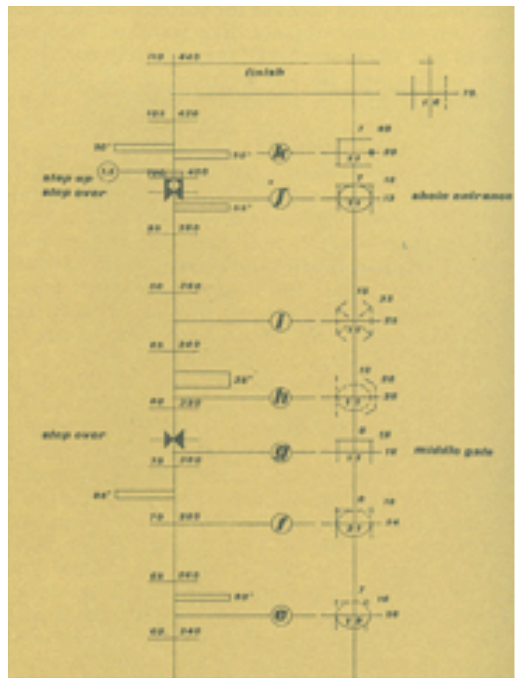


Fig. 3.9, Notation of route (with detail on right)
In: Thiel, “An Experiment in Space Notation,” *Architectural Review*, 1962

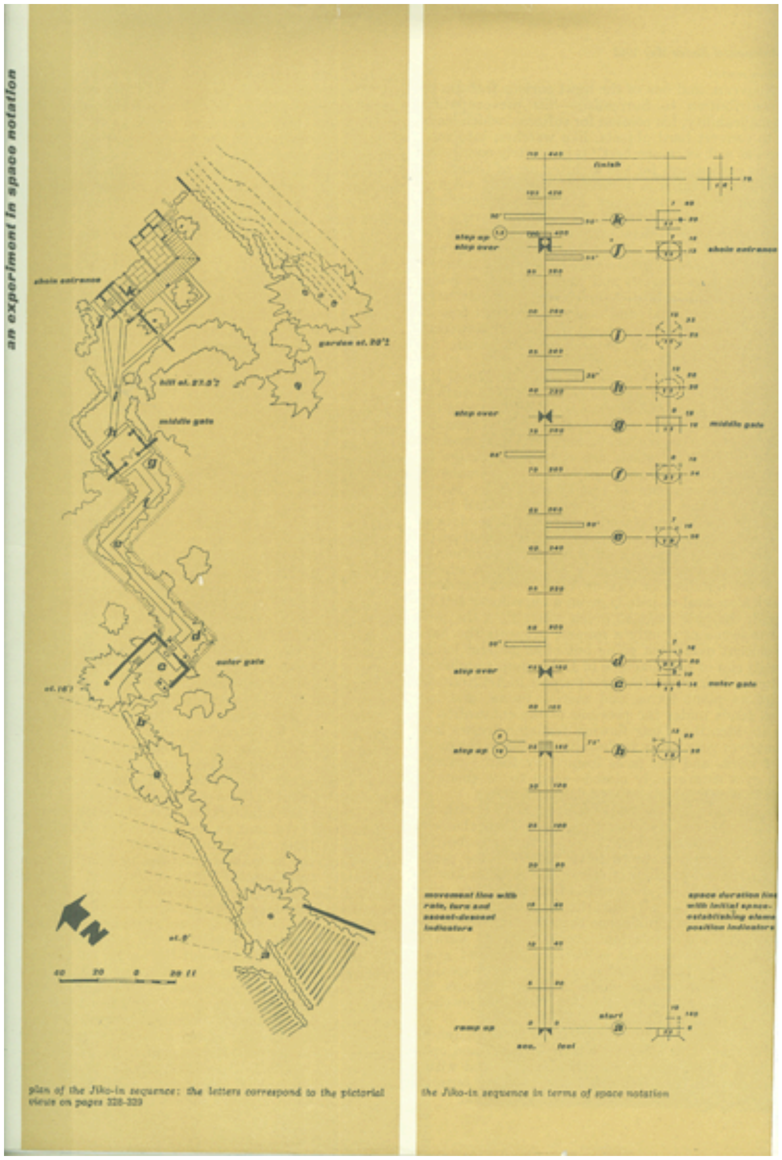


Fig. 3.10, Notation keyed to overall plan showing route taken
In: Thiel, "An Experiment in Space Notation," *Architectural Review*, 1962

Fig. 3.11, Photographs and textual descriptions of route
In: Thiel, “An Experiment in Space Notation,” *Architectural Review*, 1962

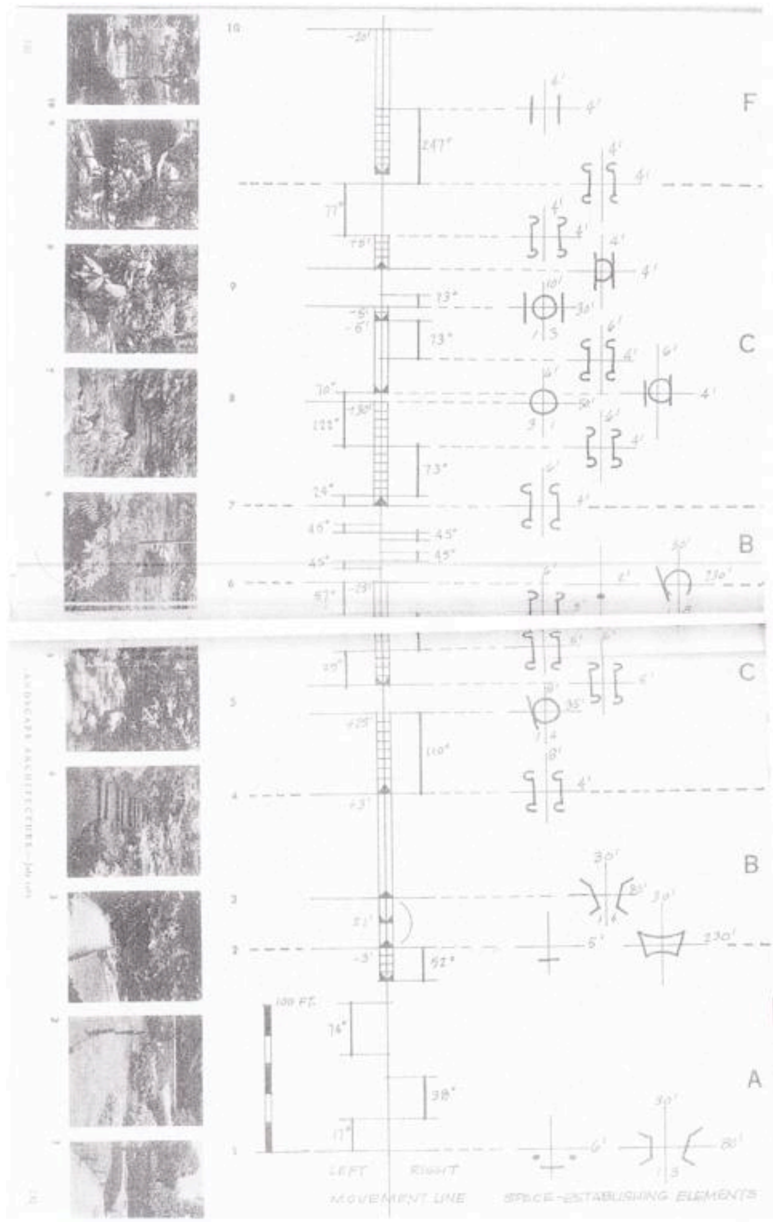


Fig. 3.12, Notation, keyed to photographic snapshots along route
In: Thiel, “An Old Garden, A New Tool, and Our Future Cities,” *Landscape Architecture*, 1962

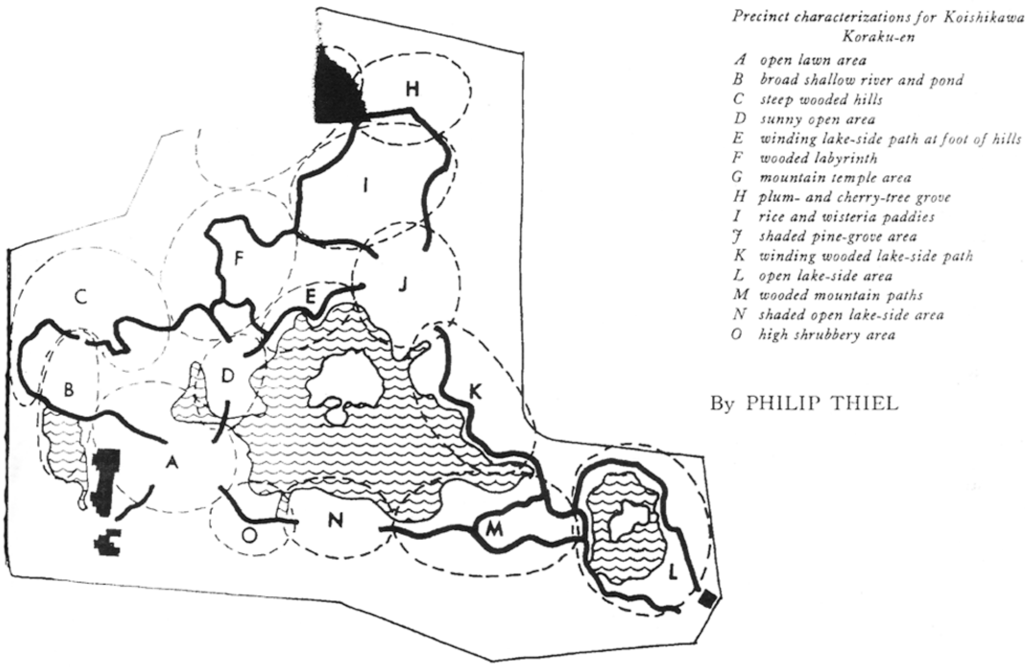


Fig. 3.13, Overall plan of garden showing districts
In: Thiel, “An Old Garden, A New Tool, and Our Future Cities,” *Landscape Architecture*, 1962

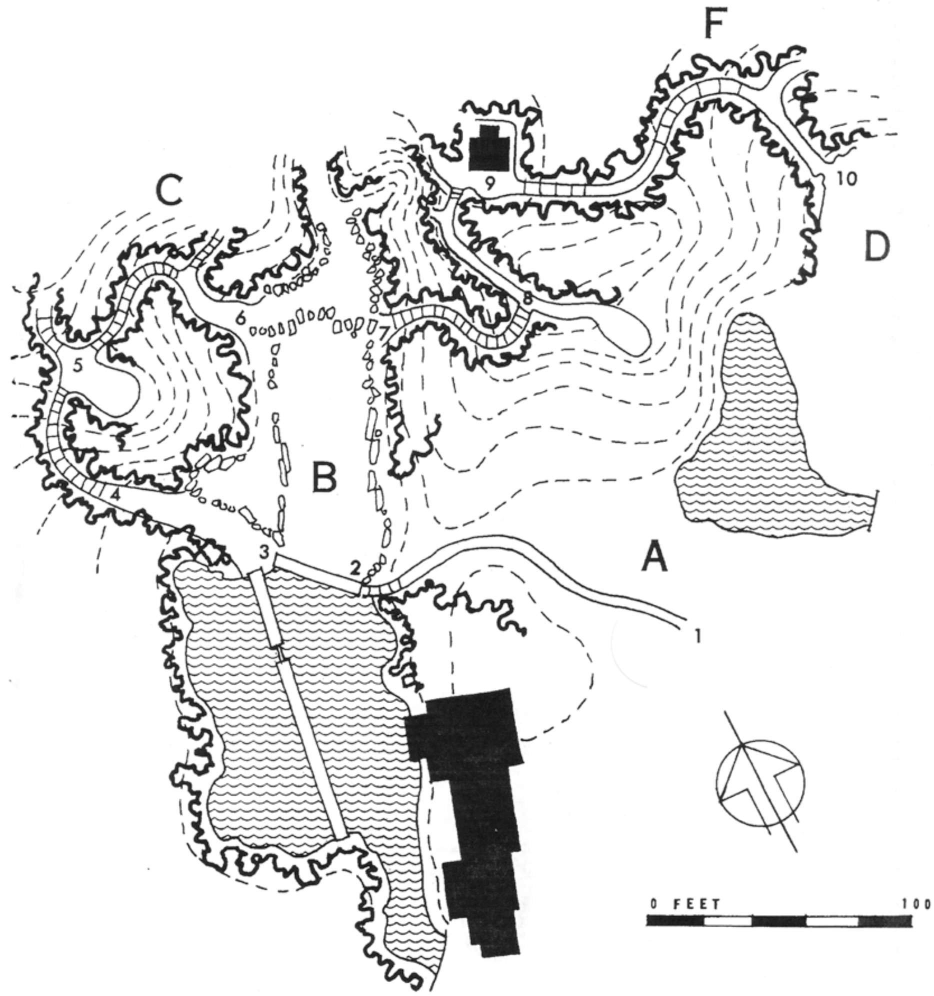


Fig. 3.14, Detailed plan showing areas through which route progressed
In: Thiel, “An Old Garden, A New Tool, and Our Future Cities,” *Landscape Architecture*, 1962

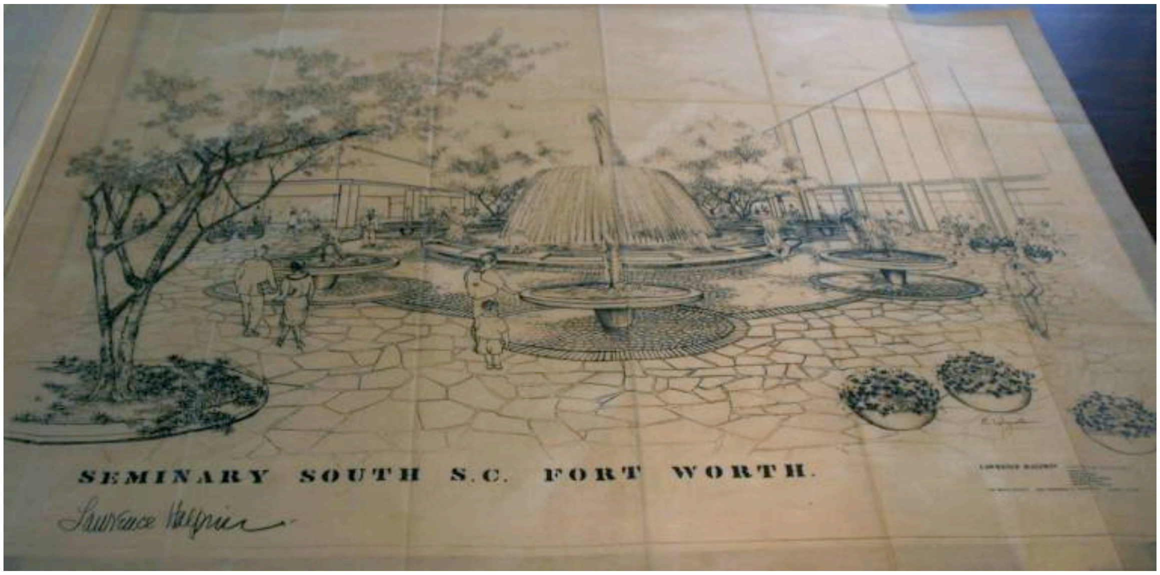


Fig. 3.15, Lawrence Halprin, Rendering of Seminary South Fountain
From the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania

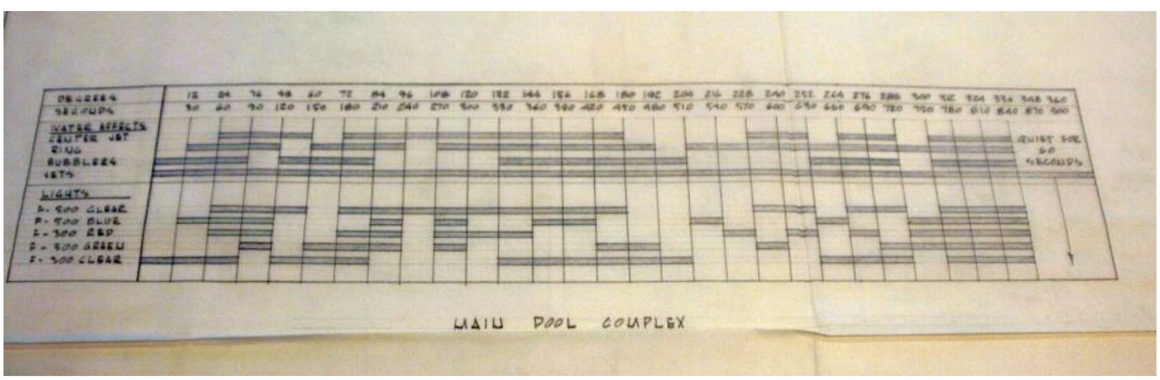


Fig. 3.16, Lawrence Halprin, *Revised Sequence, Seminary South Fountain*
From the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania

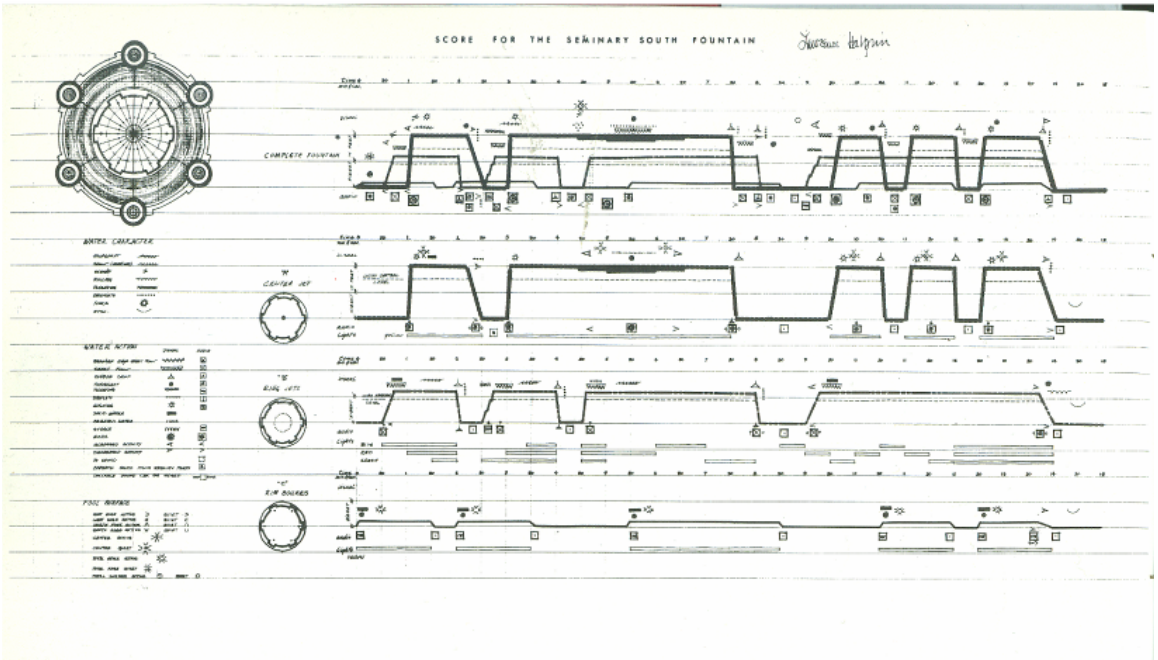
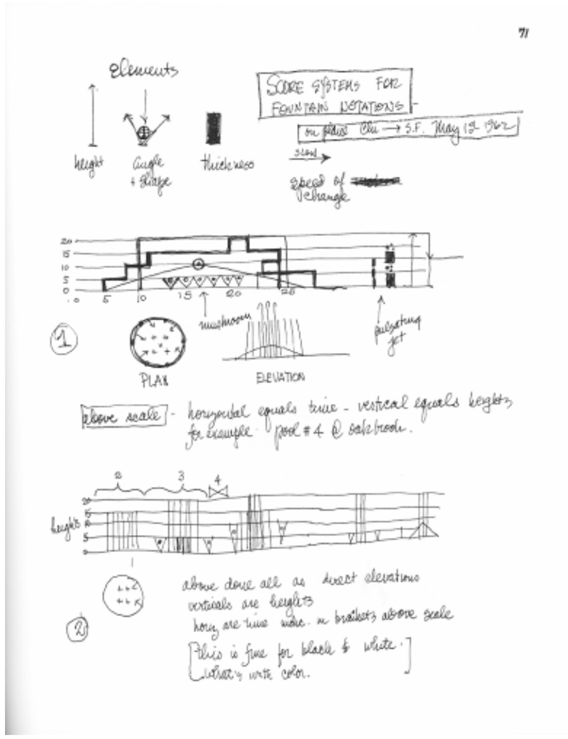


Fig. 3.17, Lawrence Halprin, *Score for the Seminary South Fountain*
From Halprin, *Cities*, 1963

Fig. 3.18, Lawrence Halprin, Oakbrook Terrace Overall Plan, First Pass
From the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania



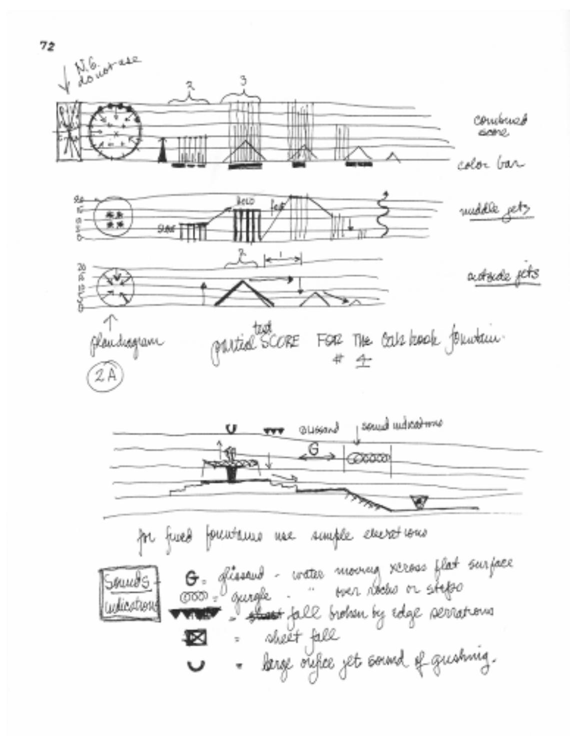


Fig. 3.19, Lawrence Halprin, “Score Systems for Fountain Notations,” Oakbrook Terrace Fountain
From *The Notebooks of Lawrence Halprin, 1959-1971*, 1972

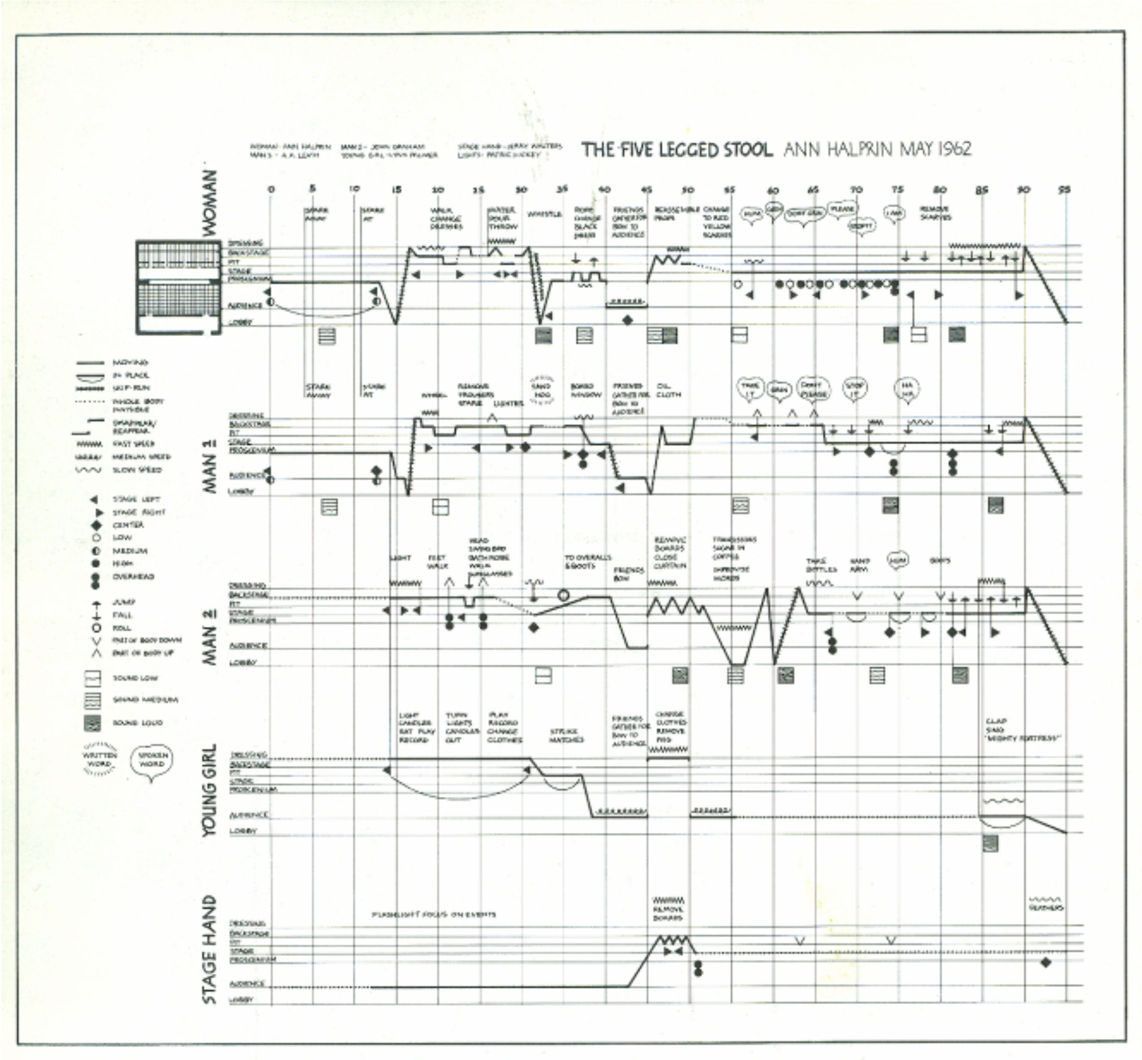
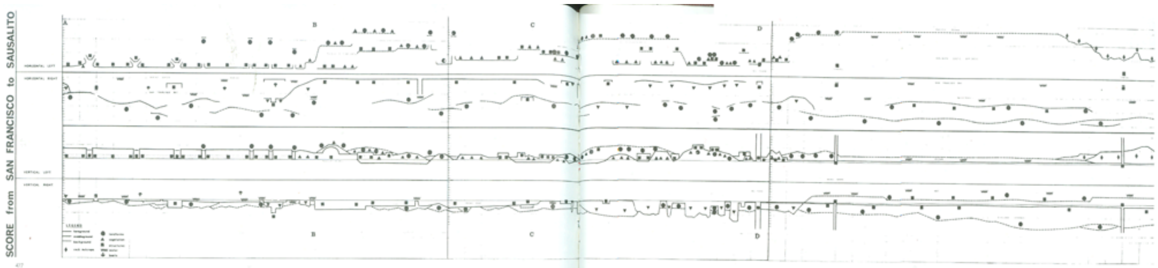


Fig. 3.20, Lawrence Halprin, Score for *Five Legged Stool*, 1962
From Halprin, *RSVP Cycles*, 1969



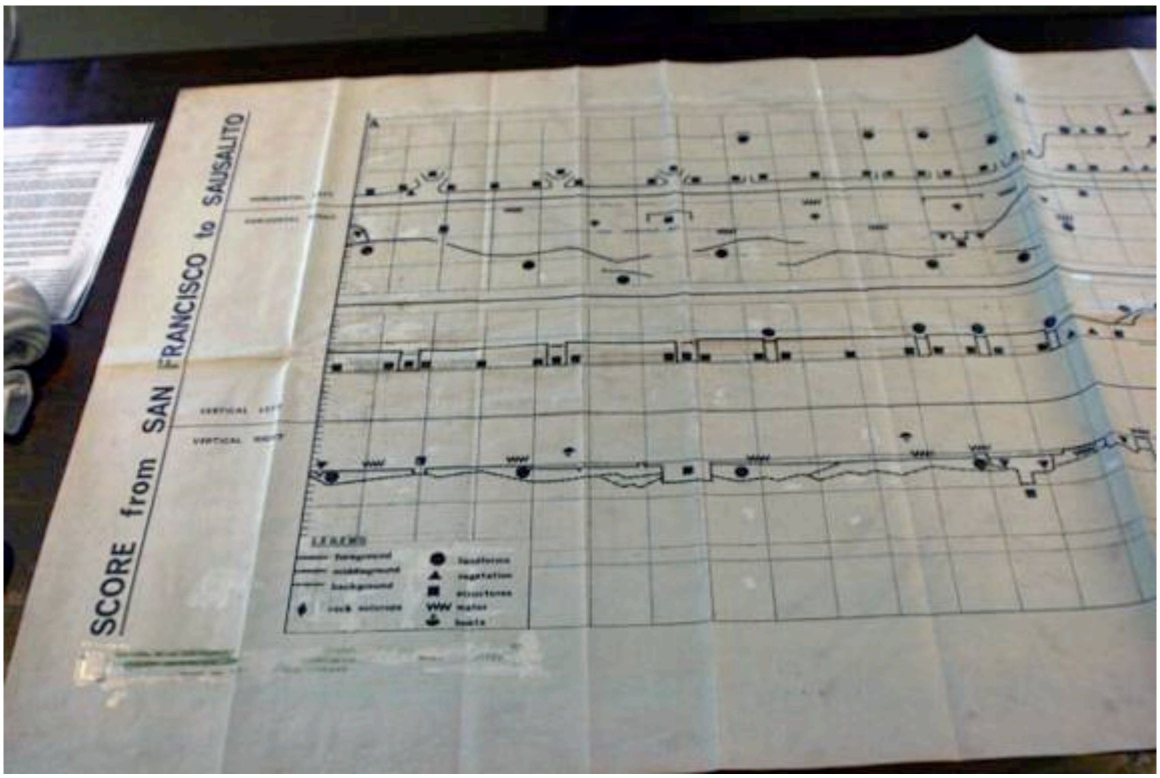


Fig. 3.21, Score from San Francisco to Sausalito
Above: Overall score, from Halprin, *Cities*, 1963
Below: Score detail, from the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania

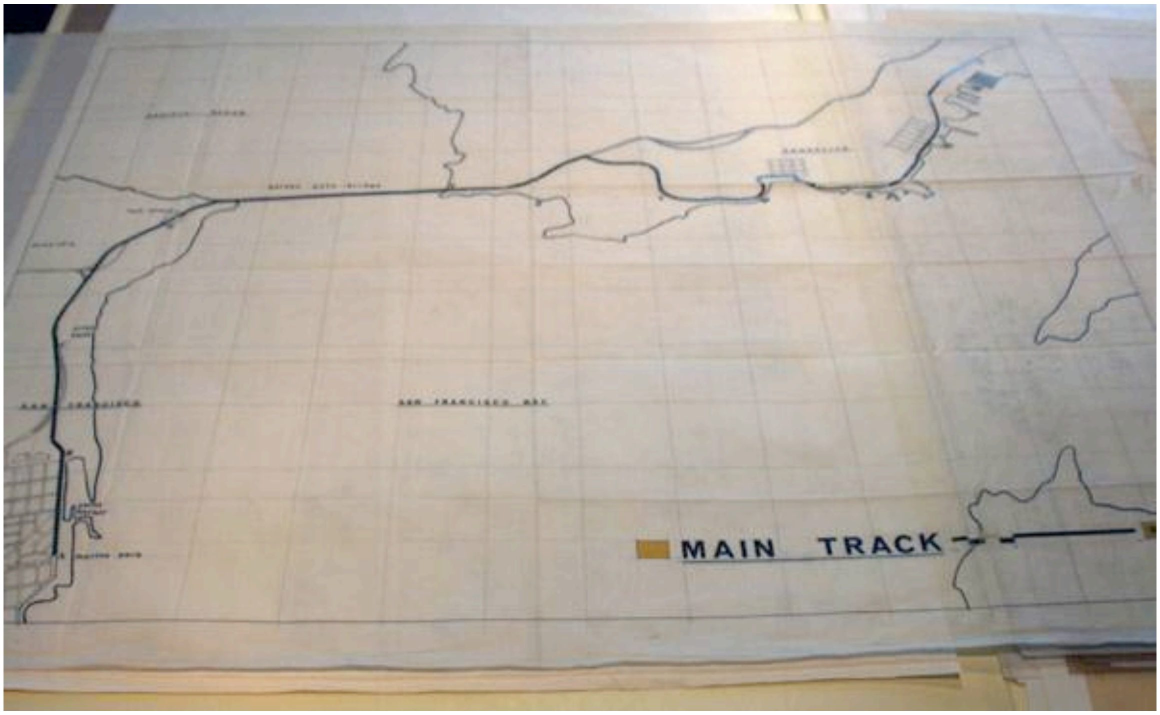


Fig. 3.22, Main Track for Score from San Francisco to Sausalito with detail view below
From the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania

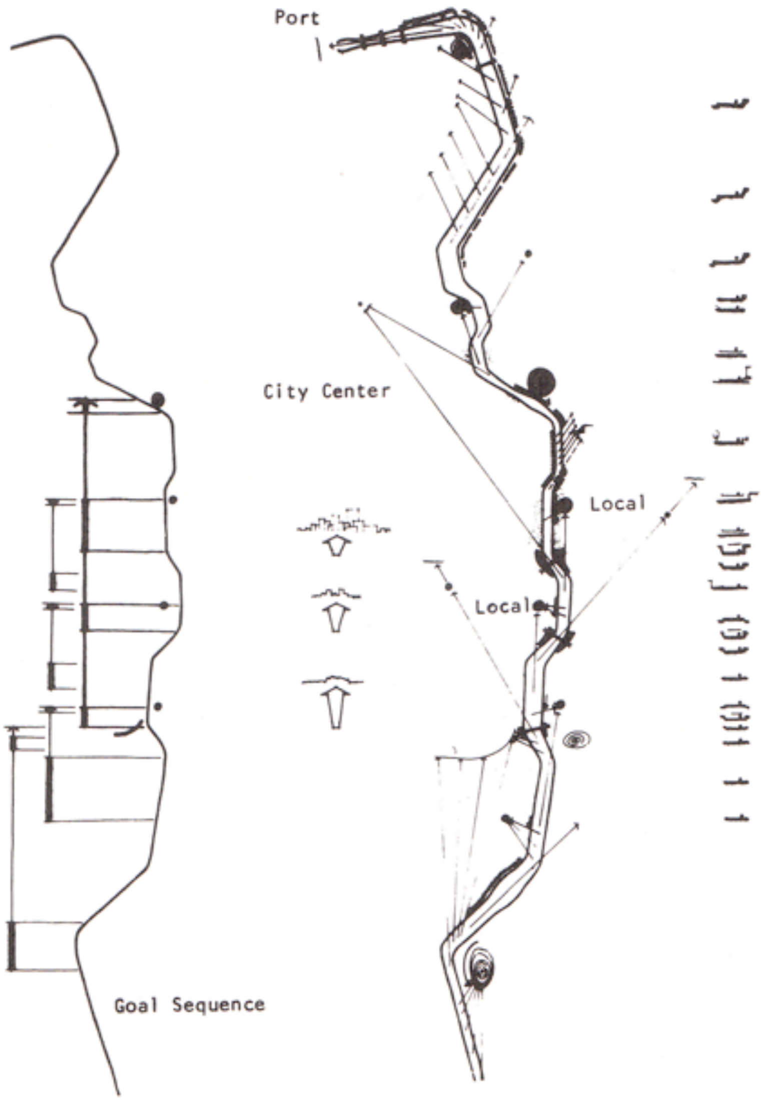


Fig. 3.23, George Kurilko, Notation diagram for the design of Ciudad Guayana:
Linkage of spatial elements with main highway, 1962
In: Appleyard, *Planning a Pluralist City: Conflicting Realities in Ciudad Guayana*, 1976

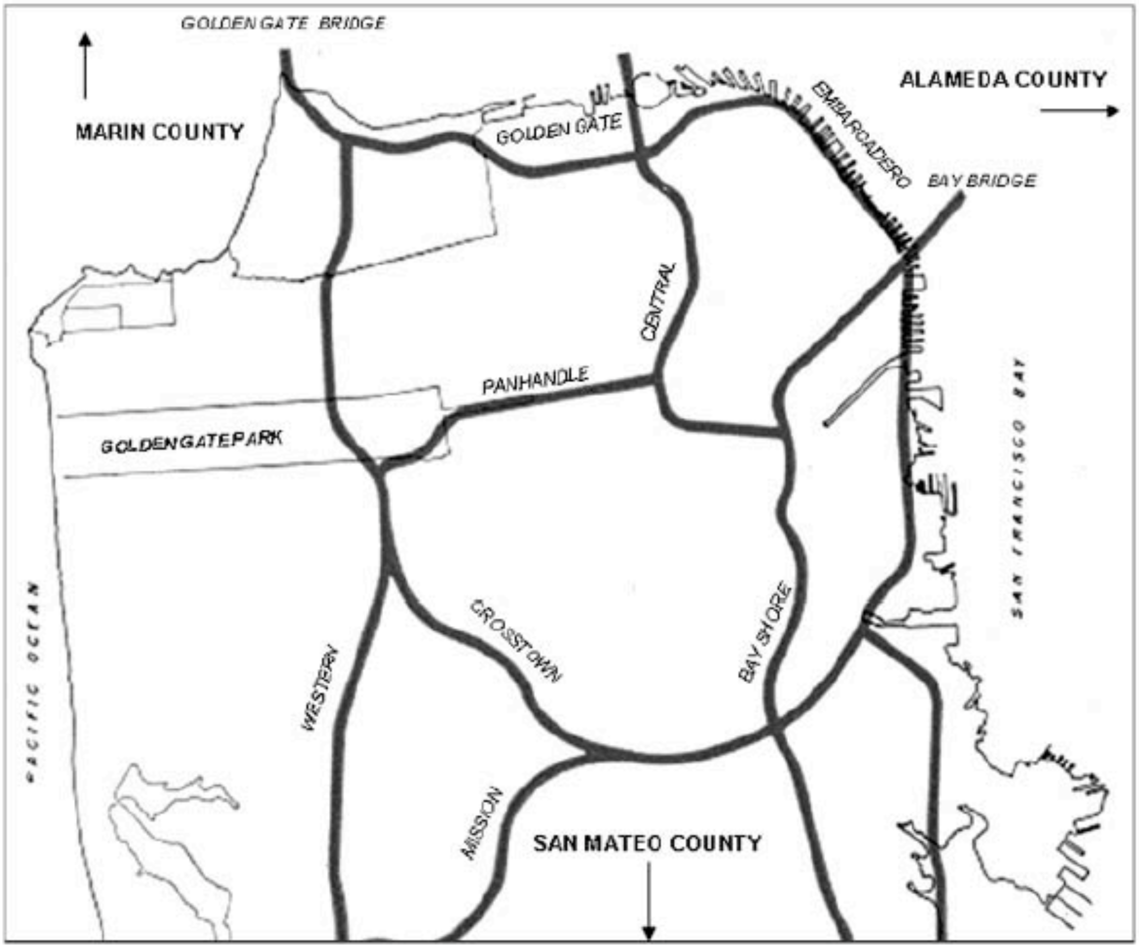


Fig. 3.24, State Freeway Plan for San Francisco, 1958
In: Johnson, “Captain Blake versus the Highwaymen,” *Journal of Planning History* 8, 2009

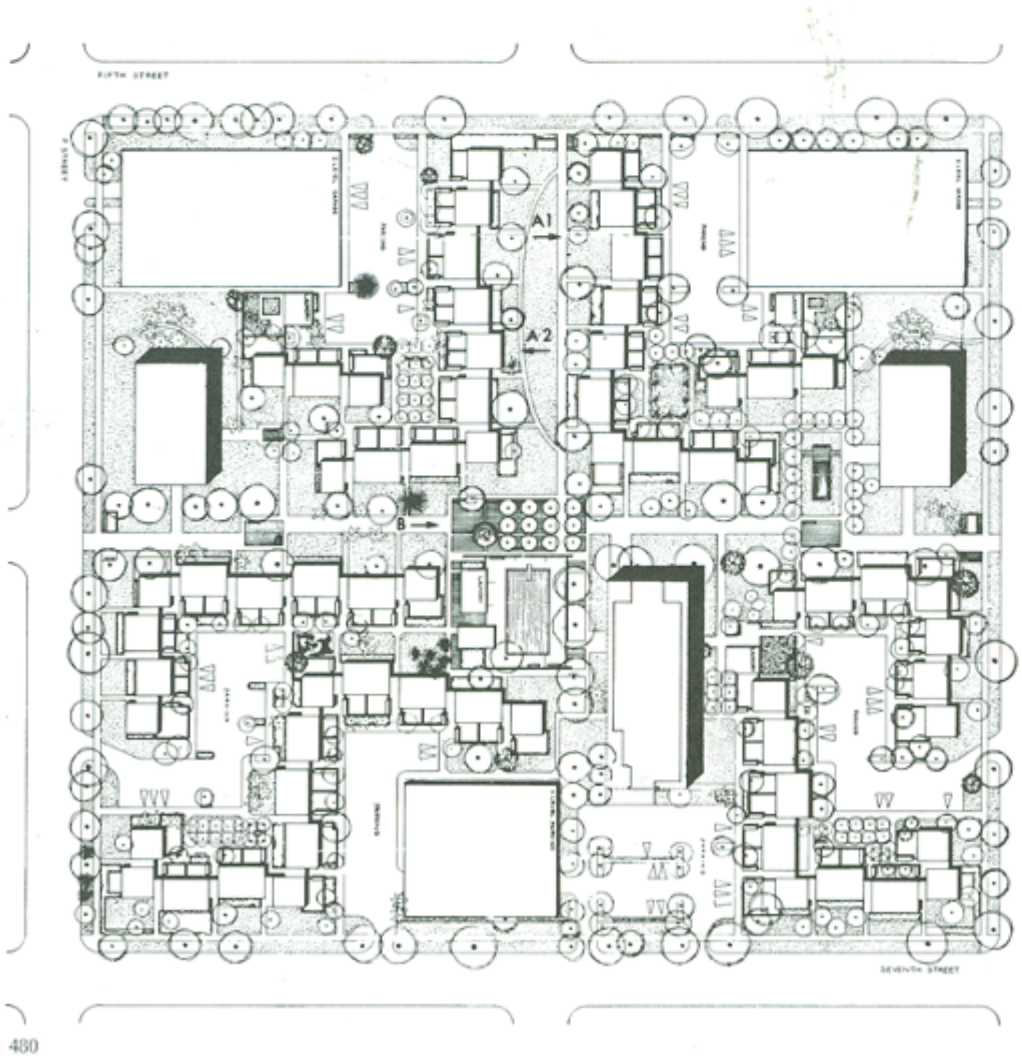


Fig. 3.25, Overall Plan and Key Frame,
Scores for Walks Through Capitol Towers
From Halprin, *Cities*, 1963

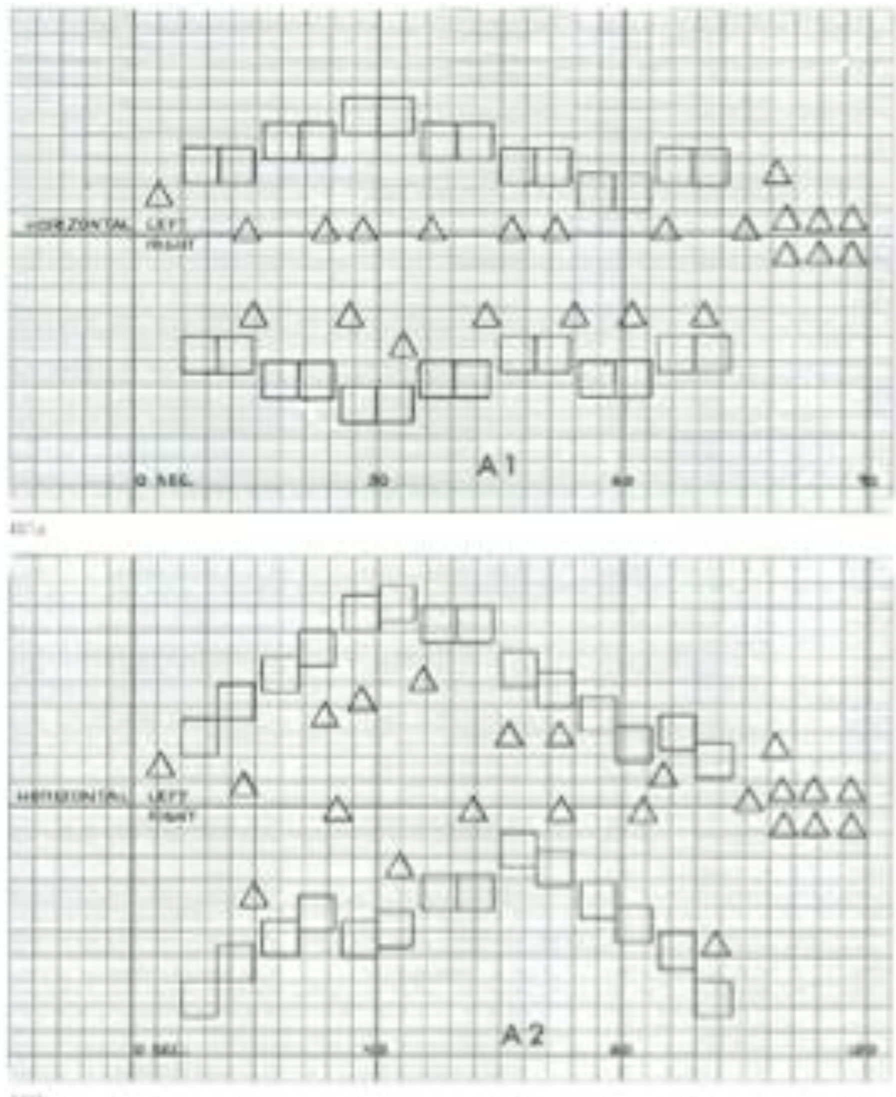
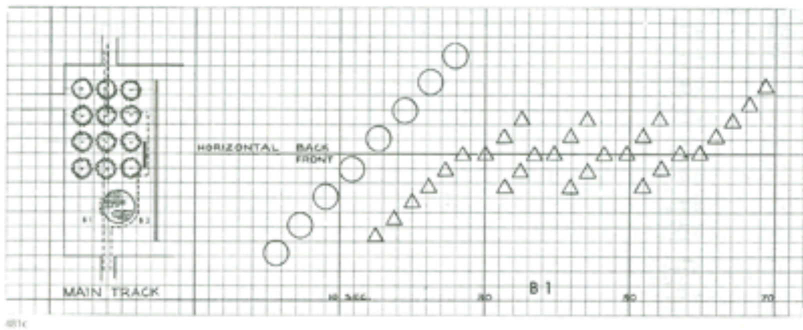


Fig. 3.26, Scores for Walks Through Capitol Towers
Path A1 (above) and Path A2 (below)
From Halprin, *Cities*, 1963



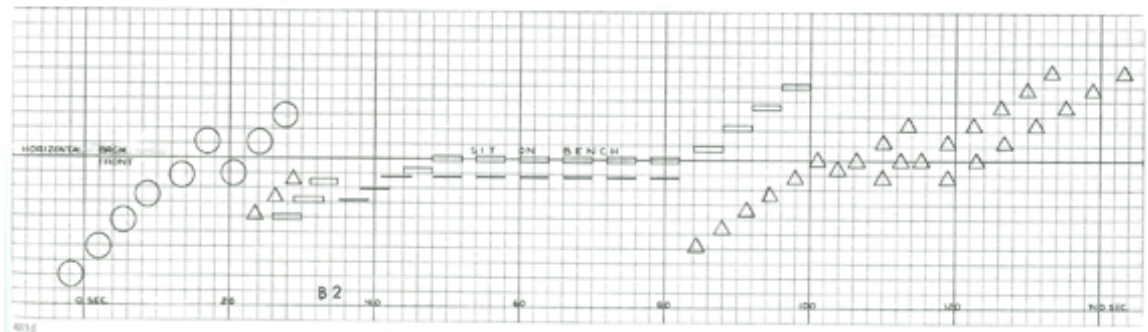


Fig. 3.27, Scores for Walks Through Capitol Towers
Path B1 (above) and Path B2 (below)
From Halprin, *Cities*, 1963

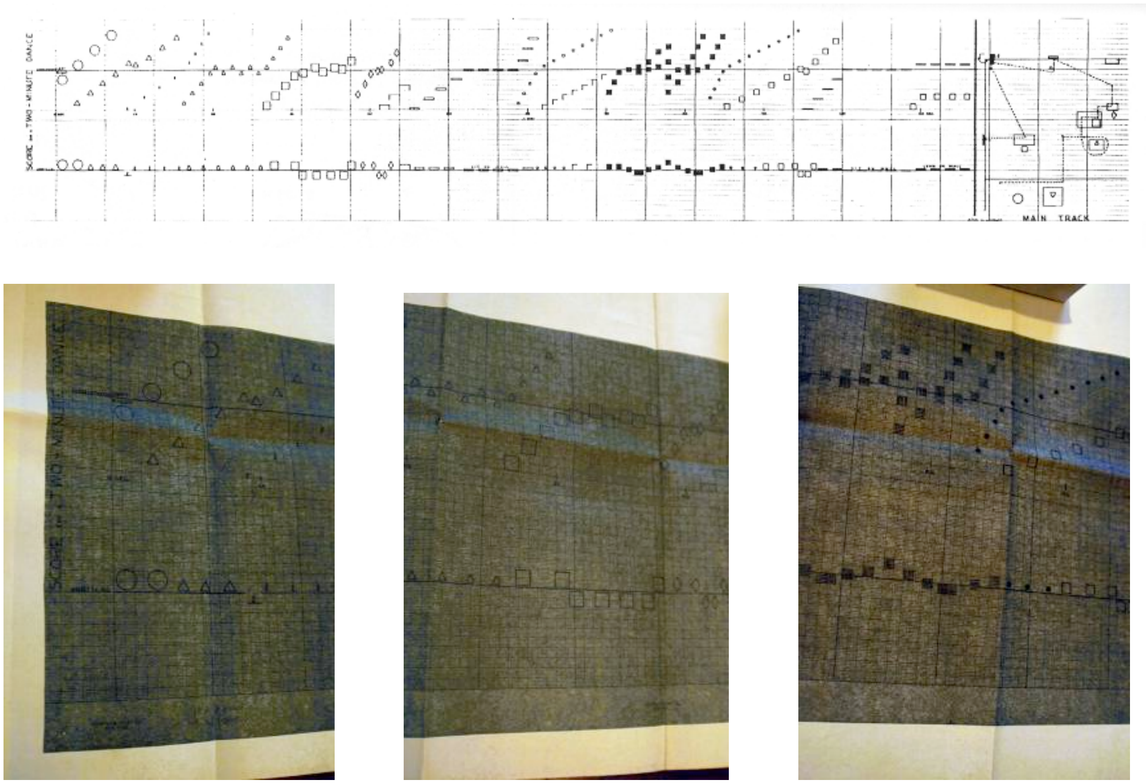


Fig. 3.28, Lawrence Halprin and Dick Jongejan, “Score for a Two-Minute Dance,” c. 1962
Above: Overall Score, from Halprin, *RSVP Cycles*, 1969
Below: Score details, from the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania

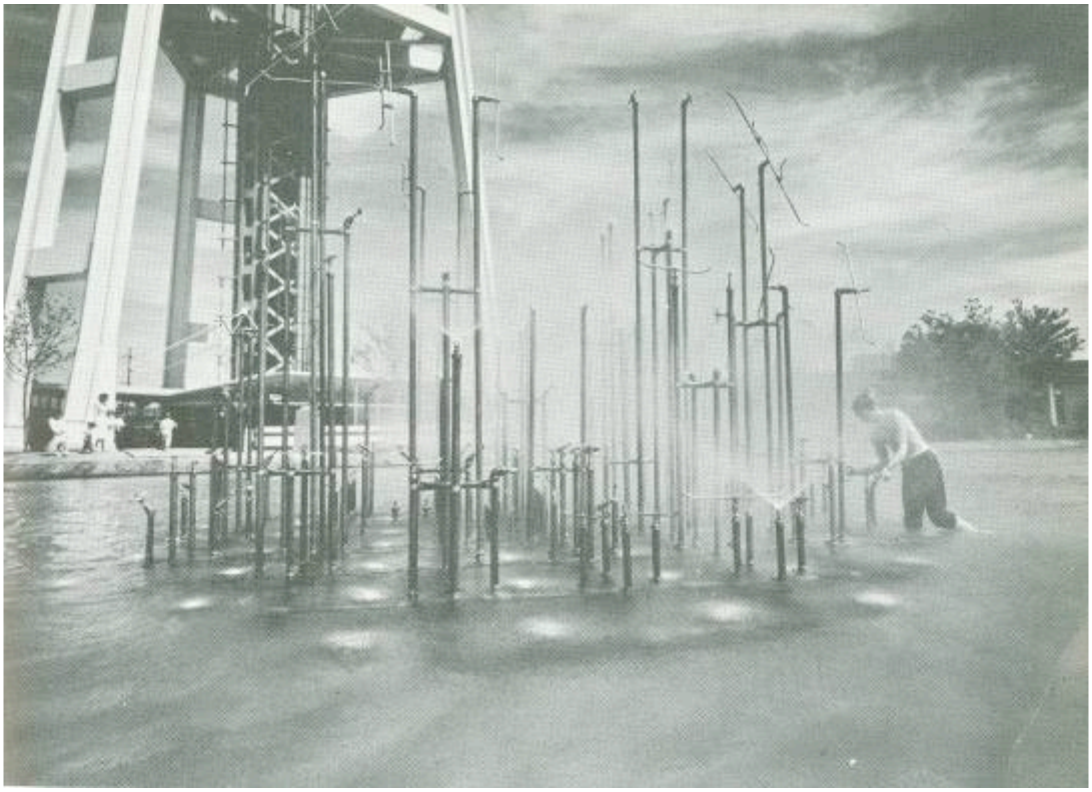


Fig. 3.29, Lawrence Halprin, Seattle Center Fountain, from Halprin, *RSVP Cycles*, 1969

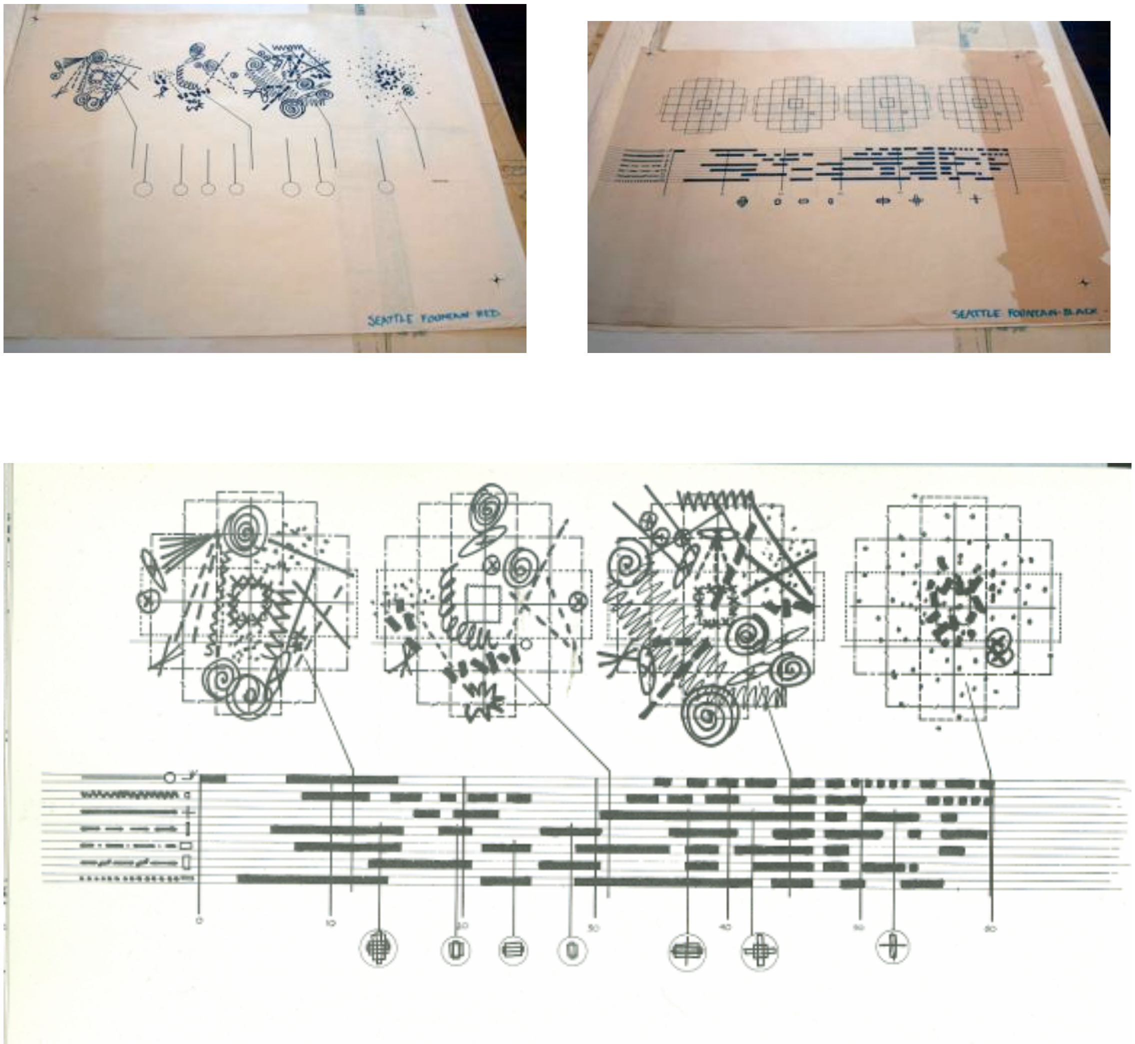


Fig. 3.30, Lawrence Halprin, Score for Seattle Center Fountain
Above: Score in two parts from Lawrence Halprin Collection, Architectural Archives of the Univ. of Pennsylvania
Below: Score, assembled, from *RSVP Cycles*, 1969

Fig. 4.1, Halprin, BART Score, Overall View
From the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania

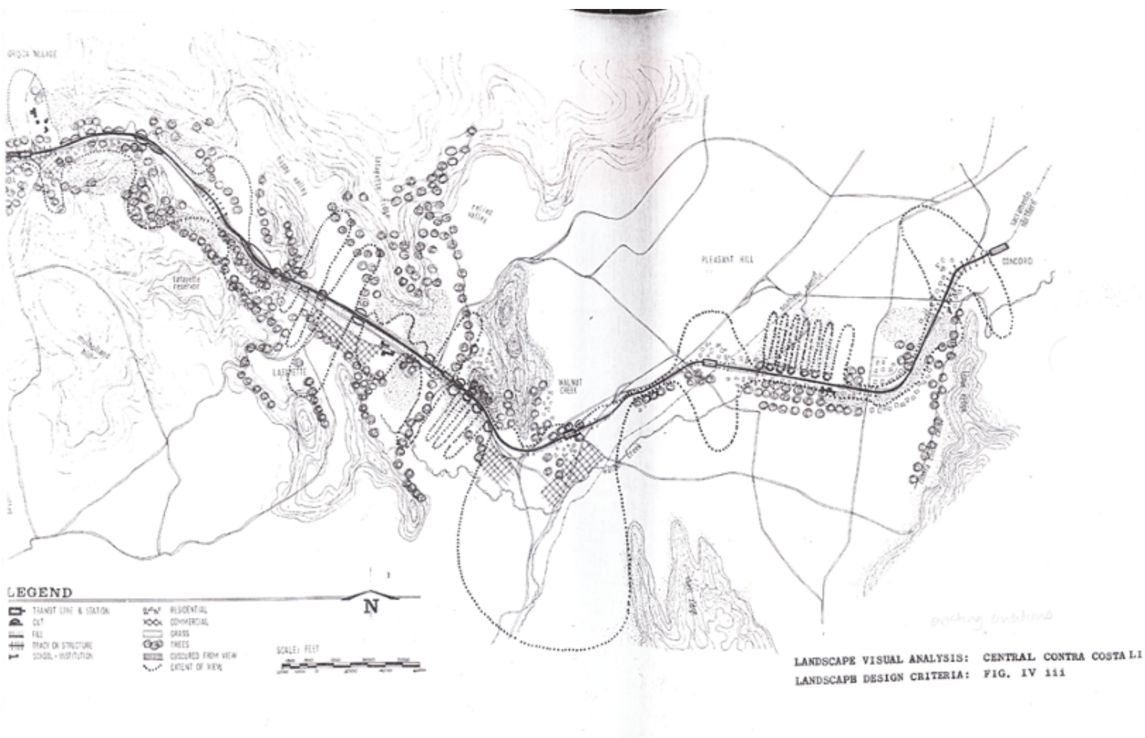


Fig. 4.2, BART Landscape Visual Analysis between Orinda and Concord
In: Halprin, *First Report to the Bay Area Rapid Transit District on Development of Landscape Design Criteria*, 1964, from the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania

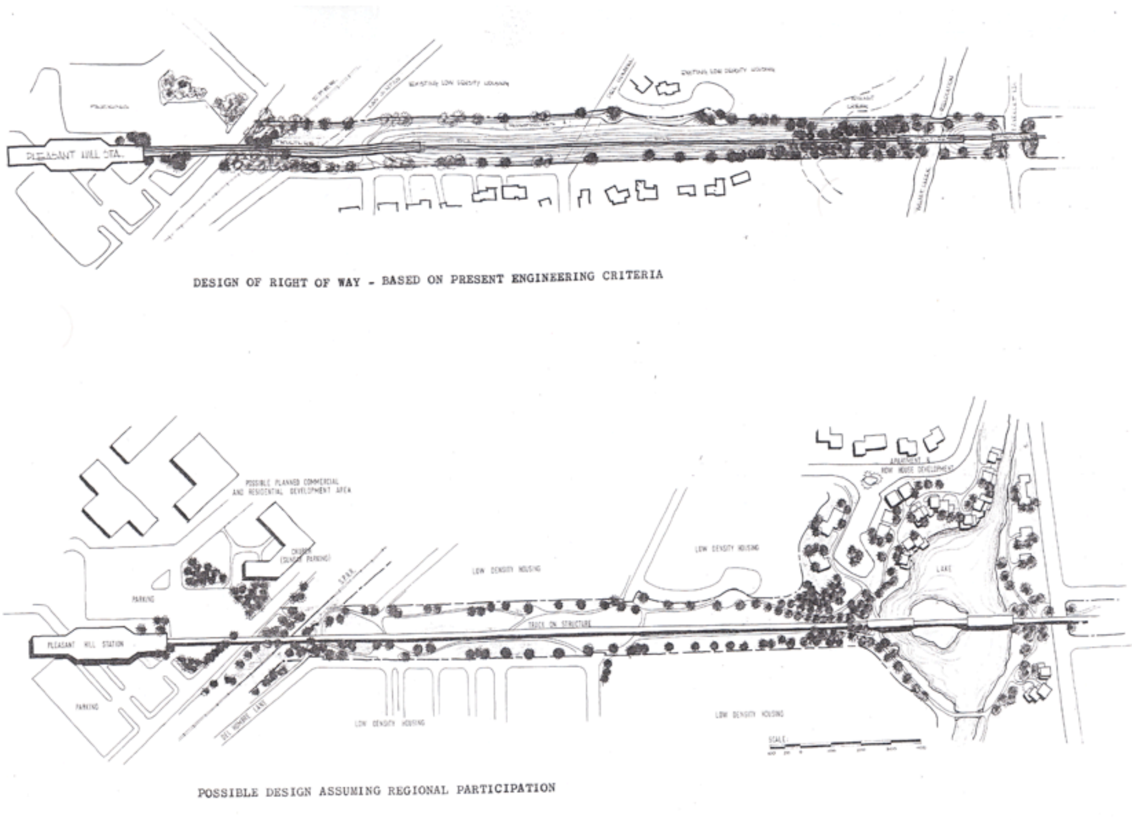


Fig. 4.3, BART Landscape Visual Analysis at A2
In: Halprin, *First Report to the Bay Area Rapid Transit District on Development of Landscape Design Criteria*, 1964, from the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania

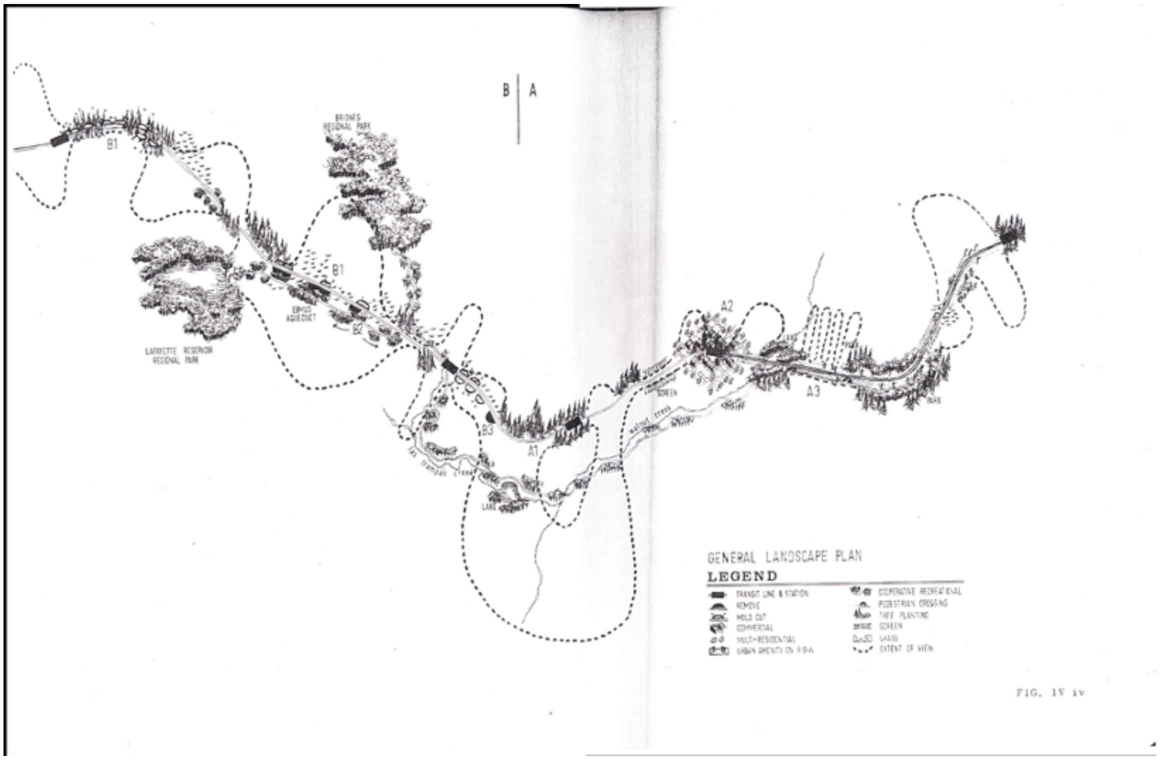


Fig. 4.4, BART General Landscape Plan between Orinda and Concord
In: Halprin, *First Report to the Bay Area Rapid Transit District on Development of Landscape Design Criteria*, 1964, from the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania

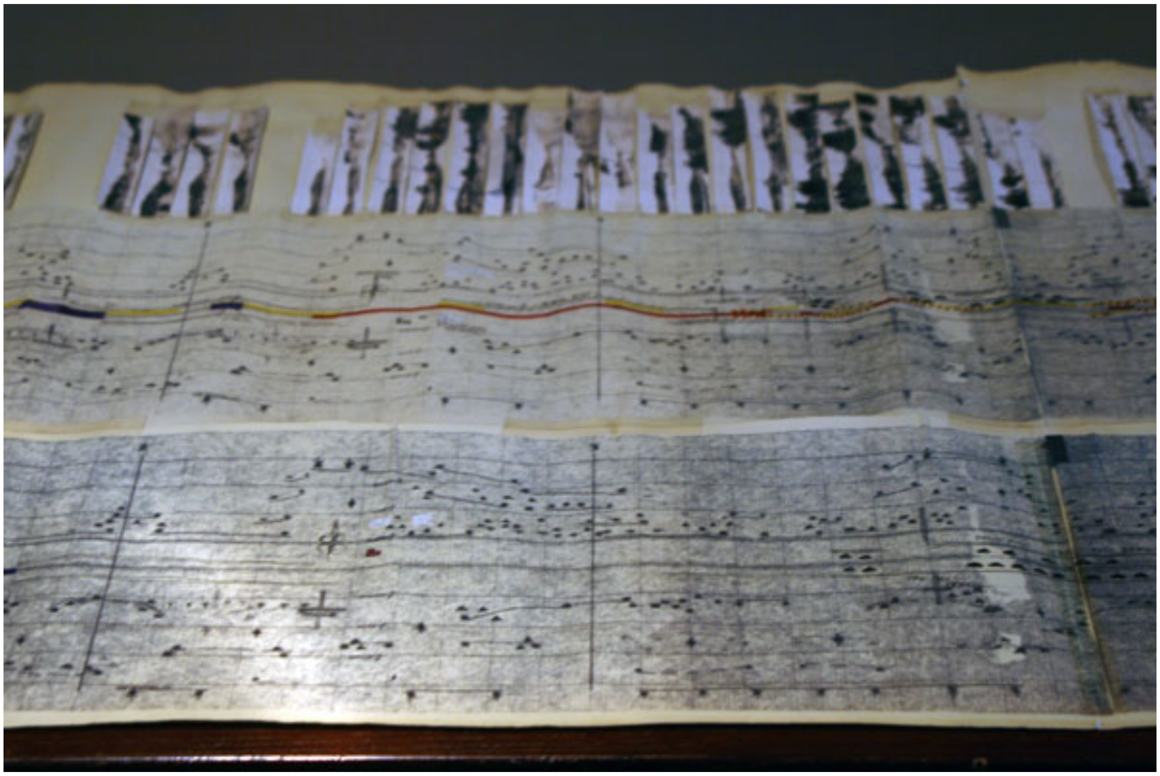
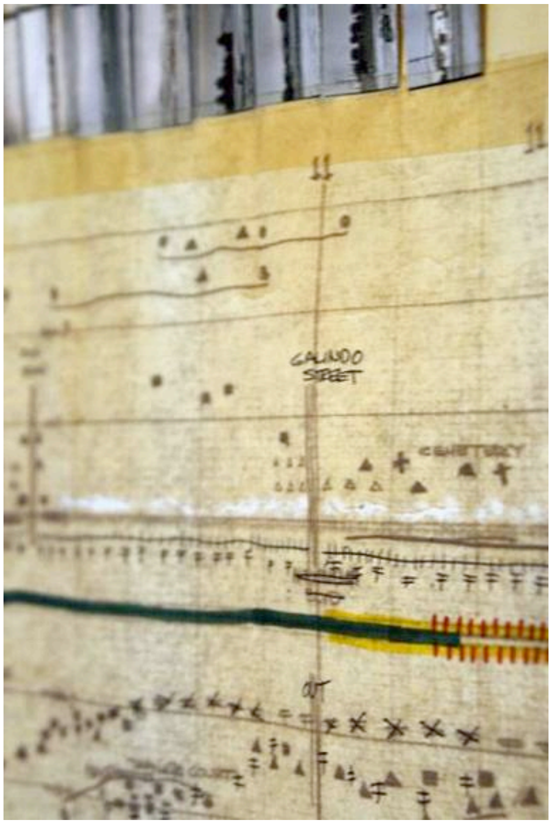


Fig. 4.5, Halprin, BART Score Detail,
Showing photographs above and two horizontal tracks below
From the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania

Fig. 4.6, Halprin, BART Score Details: Title and Legend
From the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania



Figs. 4.7-4.8, Details of BART Score showing area between mile markers 10 and 11
Left: top track, showing basic conditions; Right: bottom track, showing recommended changes
Both: From the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania

Figs. 4.9-4.10, Details of BART Score showing area at mile marker 11
Left: top track, showing basic conditions; Right: bottom track, showing recommended changes
Both: From the Lawrence Halprin Collection, Architectural Archives of the University of Pennsylvania

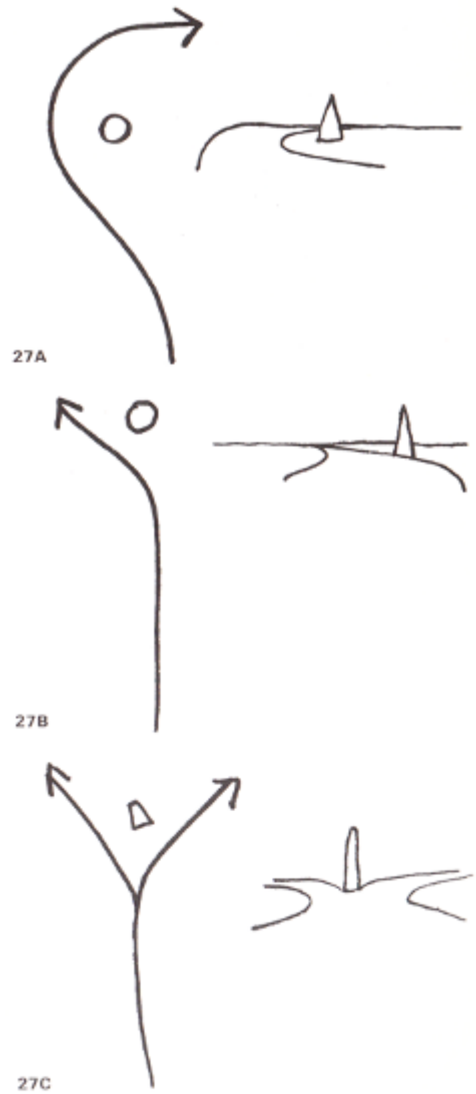


Fig. 4.11, Illustration from *The View from the Road* how turns and splits in the road should not be arbitrary but rather as the clear result of an element in the landscape that the road is trying to avoid

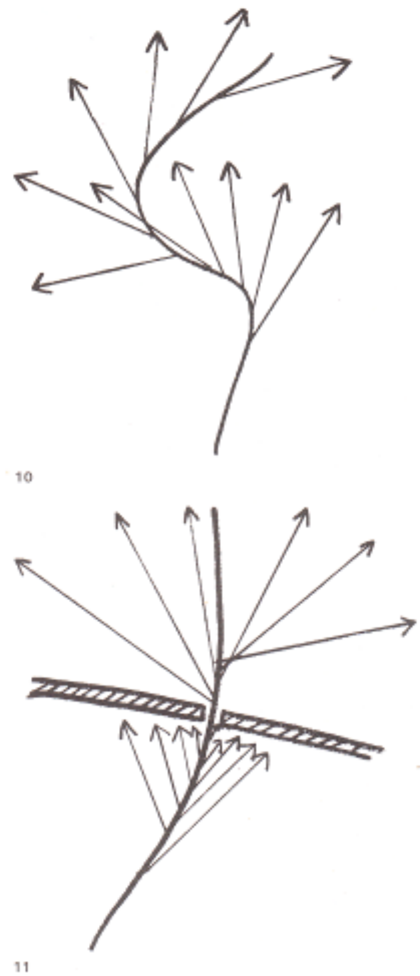
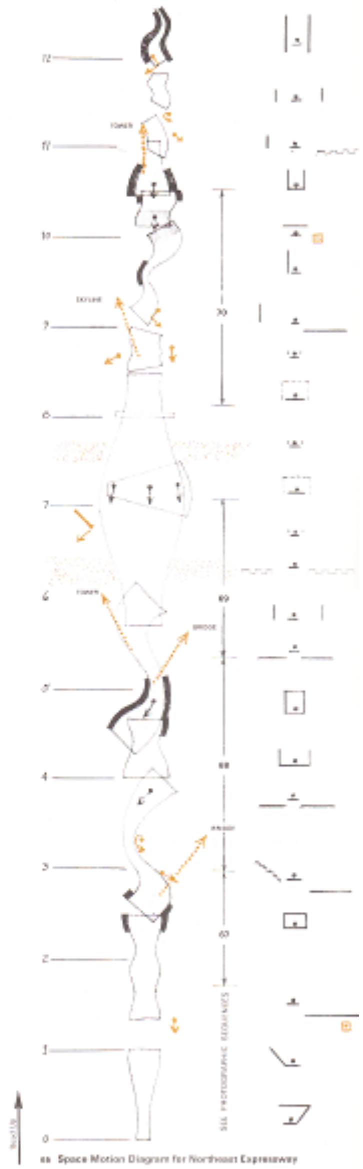
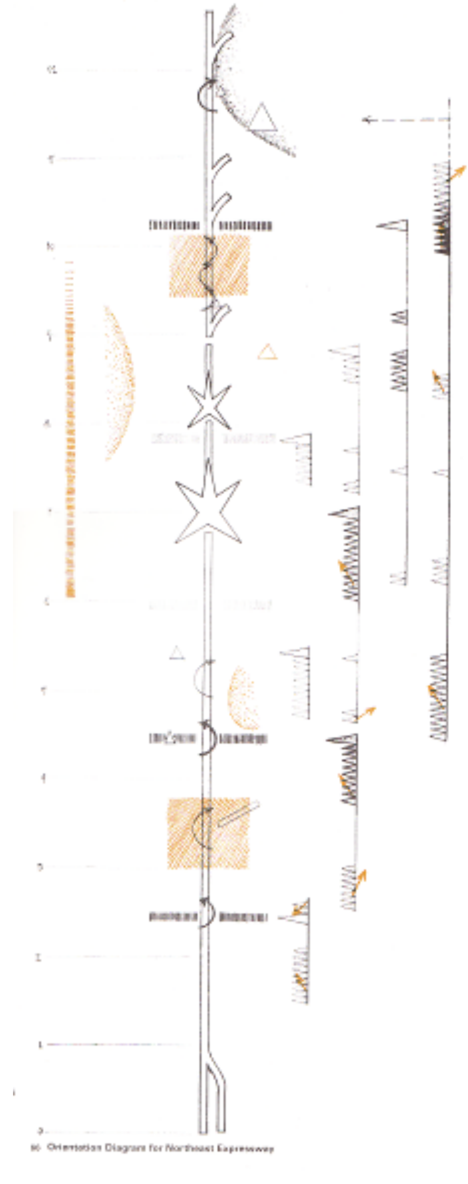


Fig. 4.12, Illustration from *The View from the Road* showing view corridors and areas of attention;
Above: attention is pulled toward outside of curves, switching back and forth across road
Below: After emerging into expansive space from constriction, attention ranges wide and far





Figs. 4.13-4.14, Space Motion and Orientation notation diagrams of Northeast Expressway
Both in: Appleyard et. al., *The View from the Road*, 1964

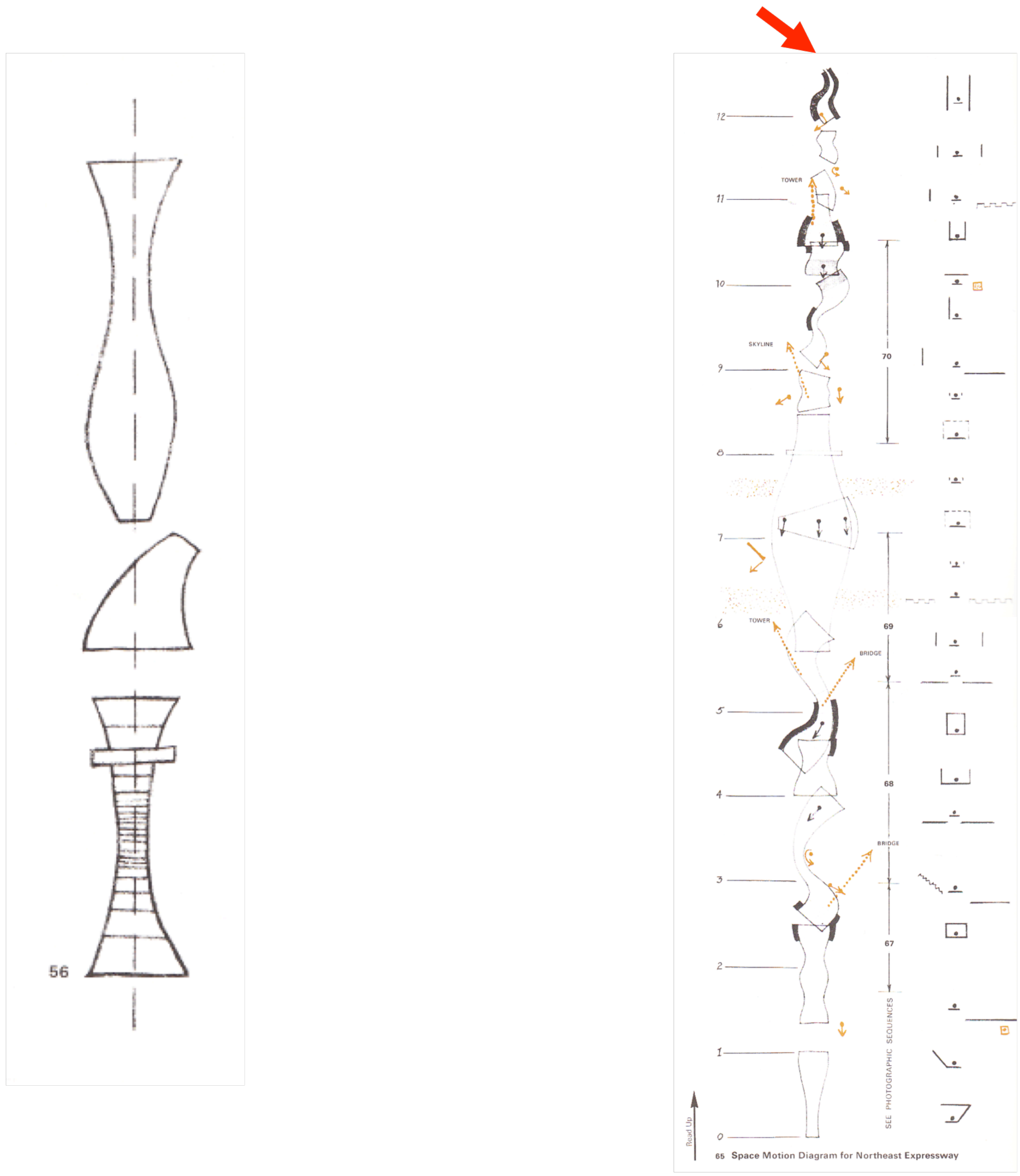


Fig. 4.15, Motion band
with location in Space Motion diagram noted at right
Both in: Appleyard et. al., *The View from the Road*, 1964

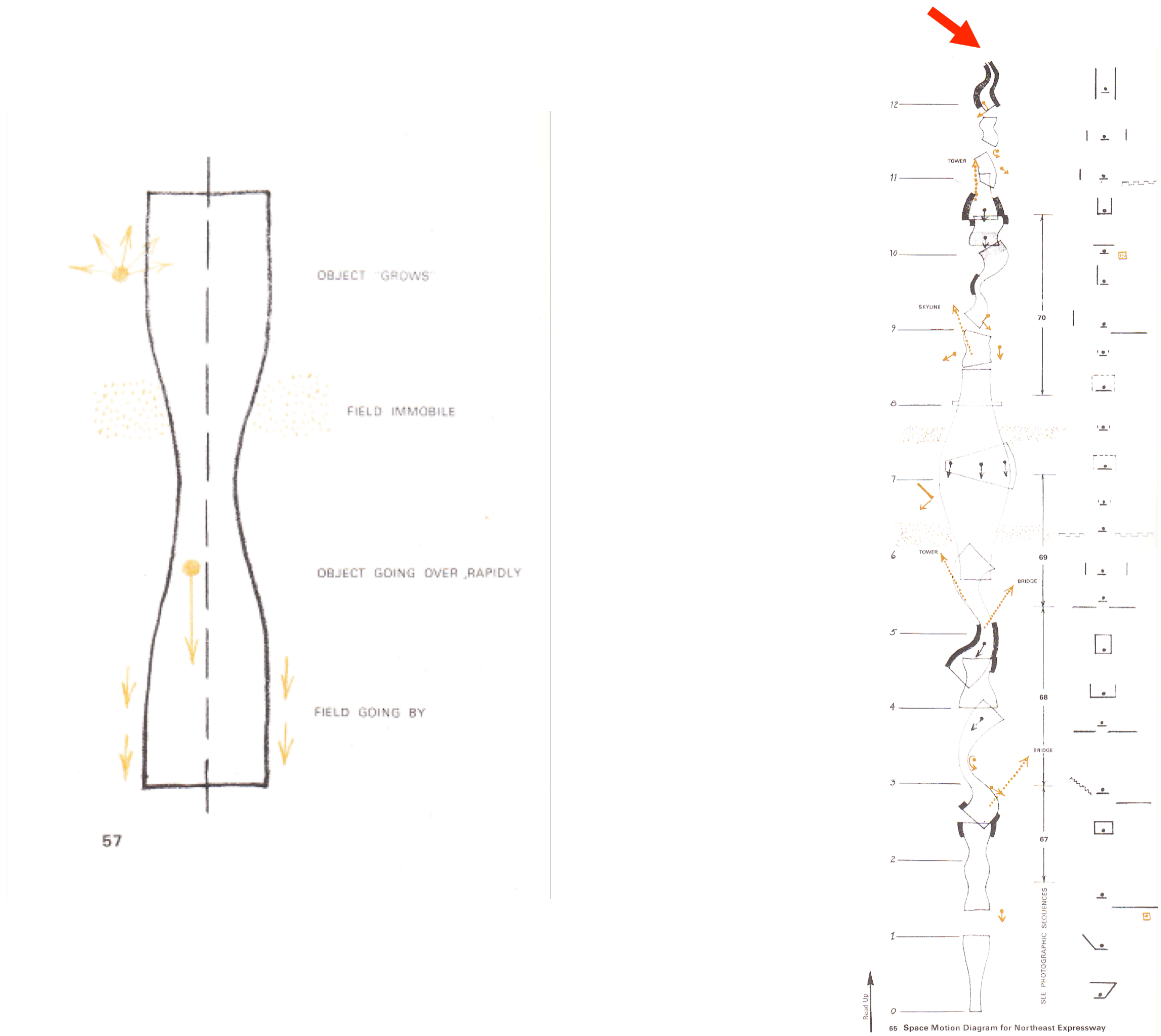


Fig. 4.16, Notation for apparent motion of field
with location in Space Motion diagram noted at right
Both in: Appleyard et. al., *The View from the Road*, 1964

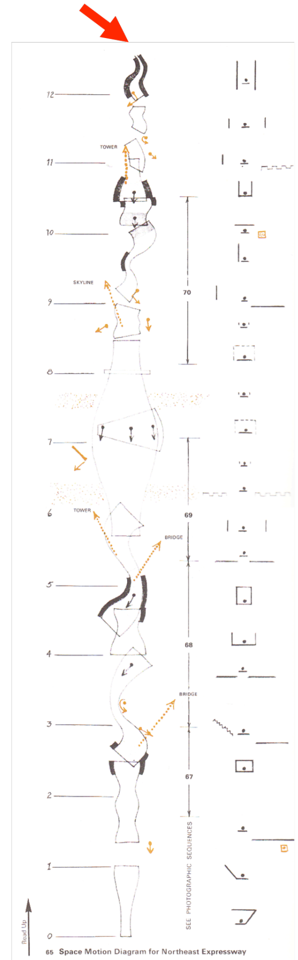
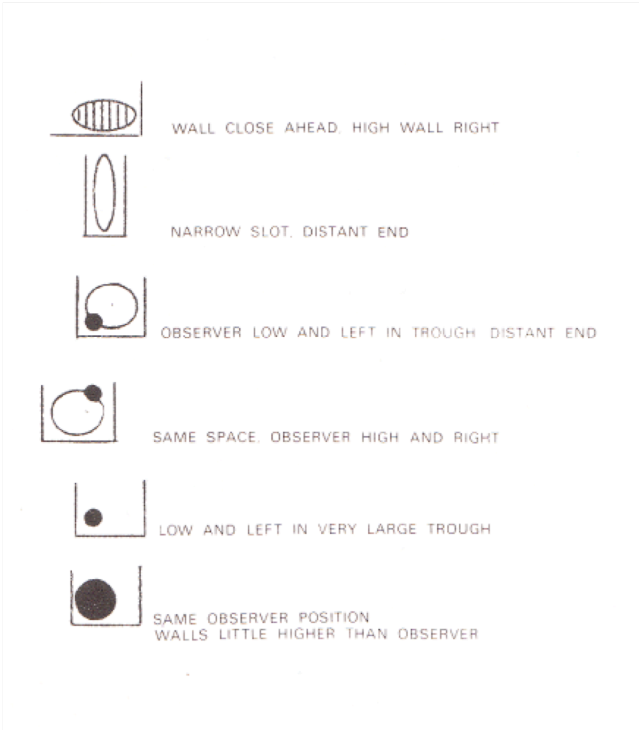


Fig. 4.17, Notation for apparent motion of objects
with location in Space Motion diagram noted at right
Both in: Appleyard et. al., *The View from the Road*, 1964



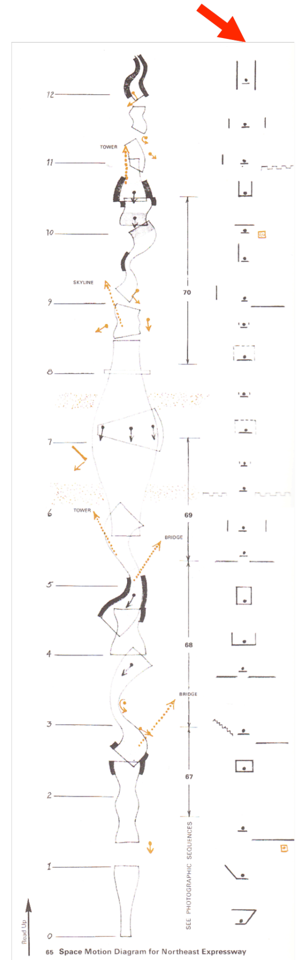


Fig. 4.18, Examples of observer positioning in space
with location in Space Motion diagram noted at right
Both in: Appleyard et. al., *The View from the Road*, 1964

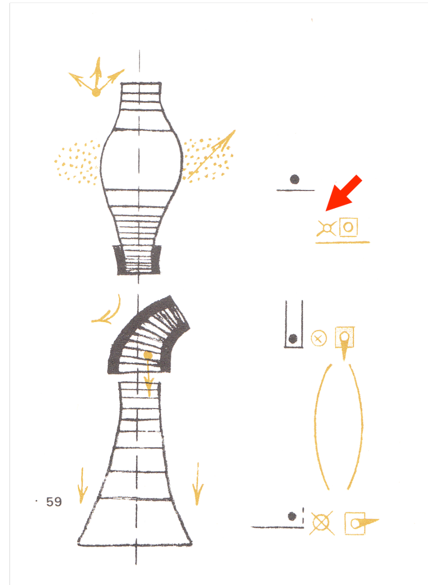
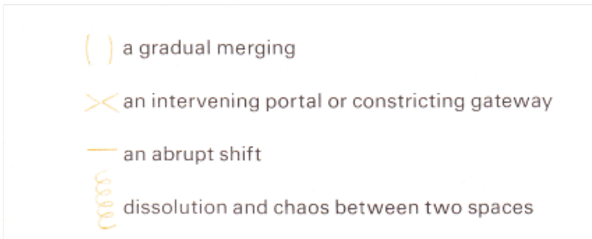


Fig. 4.19, Notation for spatial enclosure
with location in illustrative Space Motion diagram noted at right
Both in: Appleyard et. al., *The View from the Road*, 1964



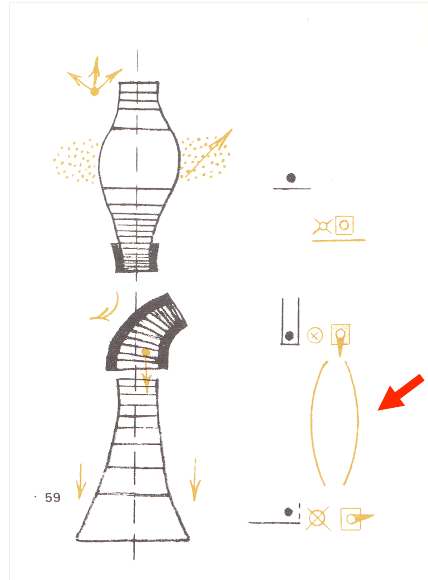
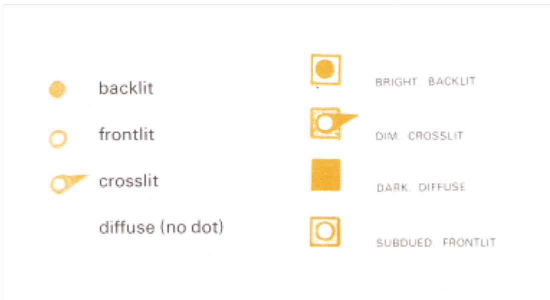


Fig. 4.20, Notation for transitions
with location in illustrative Space Motion diagram noted at right
Both in: Appleyard et. al., *The View from the Road*, 1964



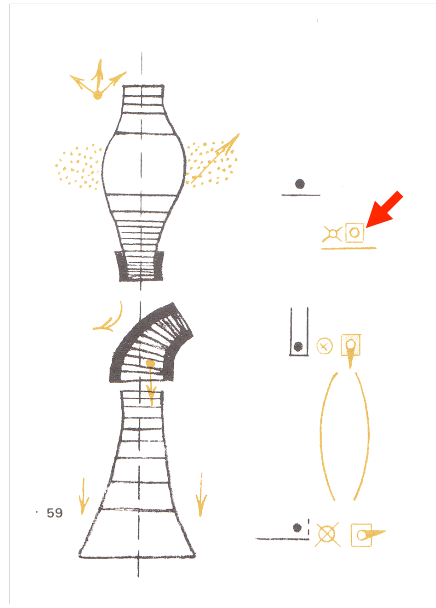
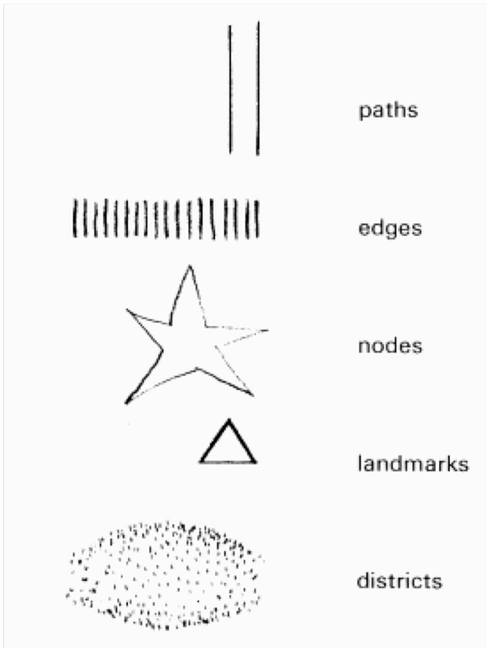


Fig. 4.21, Notation for lighting
with location in illustrative Space Motion diagram noted at right
Both in: Appleyard et. al., *The View from the Road*, 1964



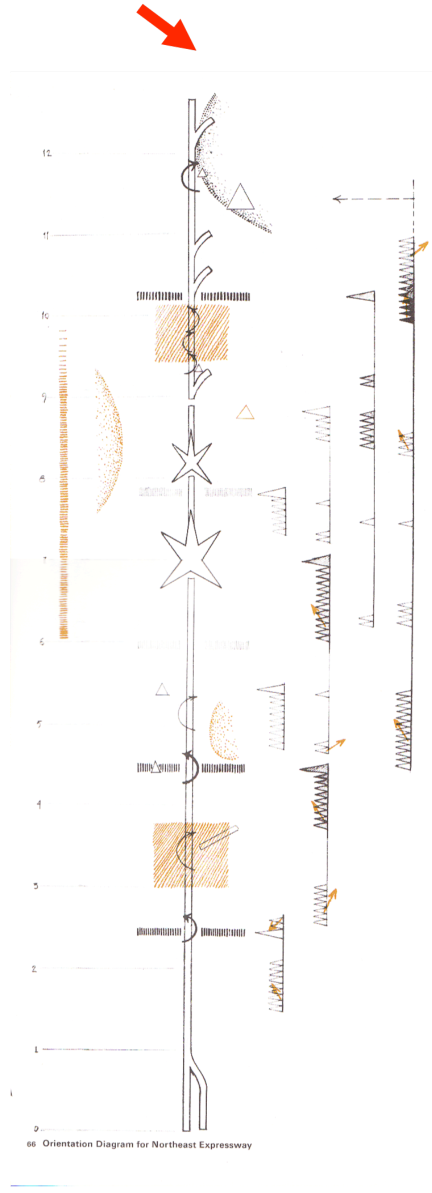
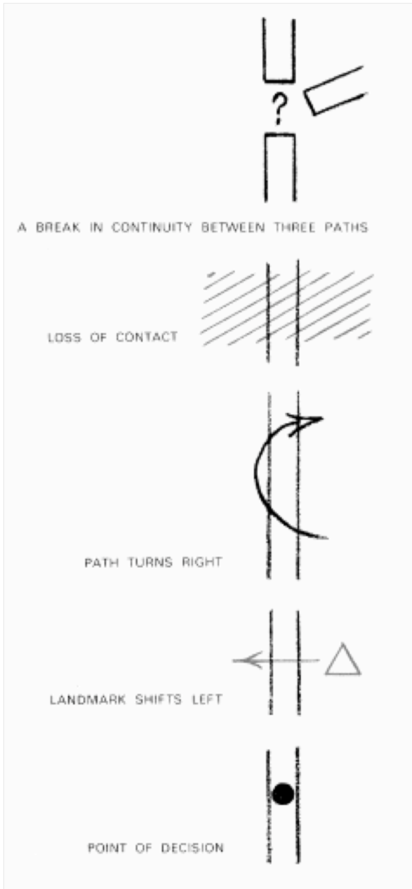


Fig. 4.22, Notation for five city elements
with location in Orientation diagram noted at right
Both in: Appleyard et. al., *The View from the Road*, 1964



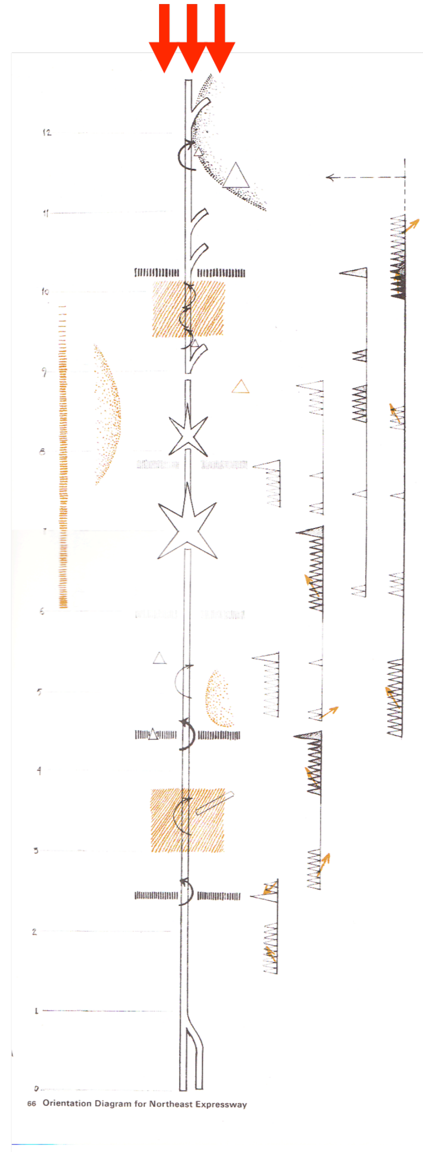


Fig. 4.23, Notation for points of decision and element interrelations
with location in Orientation diagram noted at right
Both in: Appleyard et. al., *The View from the Road*, 1964

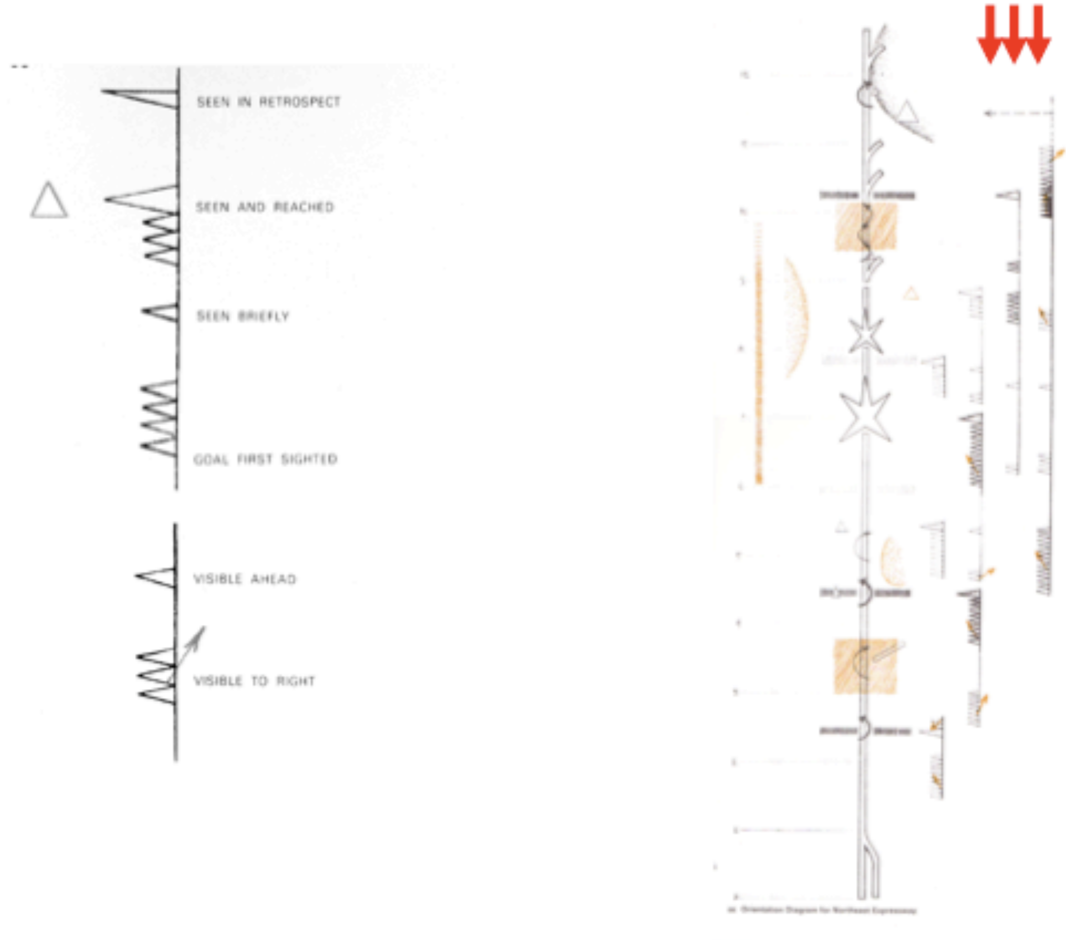


Fig. 4.24, Notation for goals and their approaches
with location in Orientation diagram noted at right
Both in: Appleyard et. al., *The View from the Road*, 1964

Fig. 4.25, Map of Northeast Expressway
In: Appleyard et. al., *The View from the Road*, 1964

Fig. 4.26, Sample photographic sequence taken along Northeast Expressway
In: Appleyard et. al., *The View from the Road*, 1964

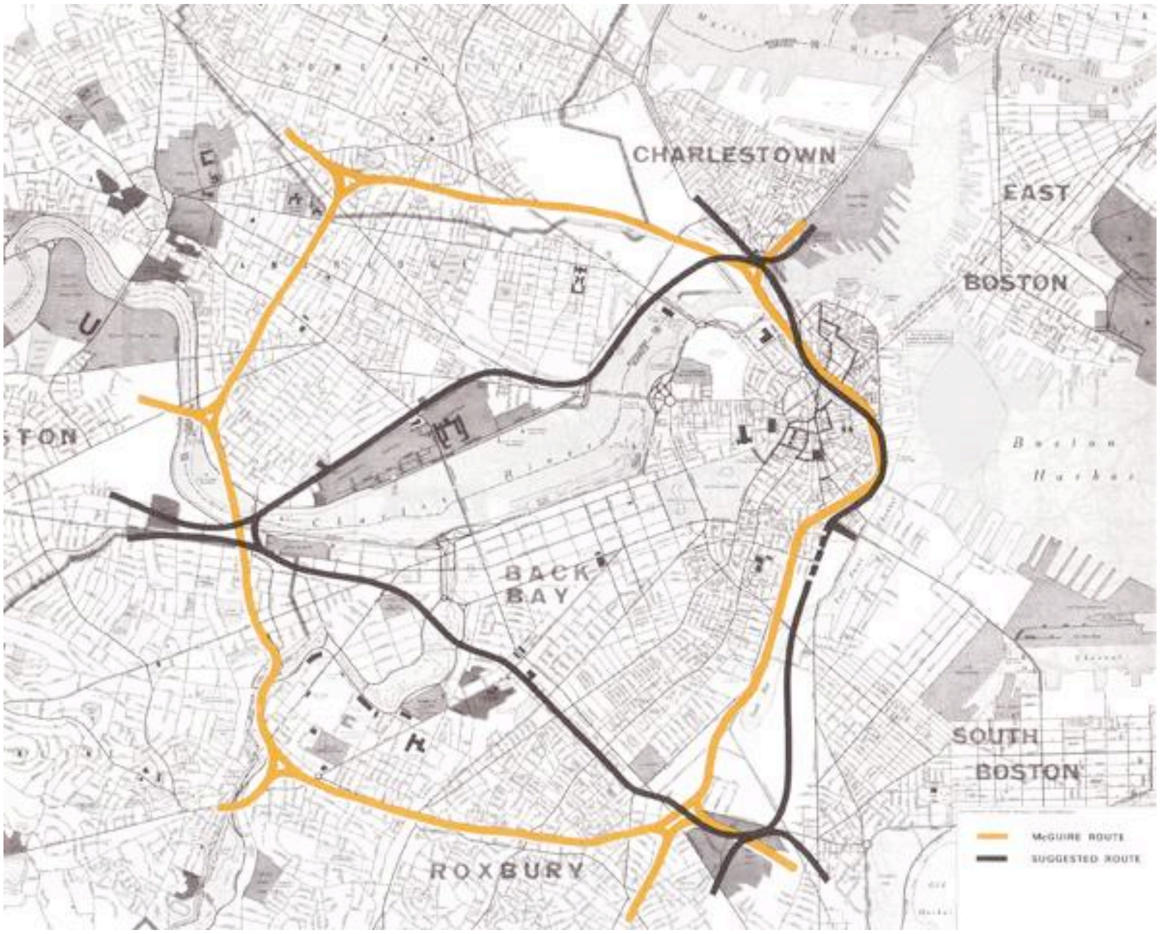


Fig. 4.27, Comparison of Proposed Route with Official Inner Belt Route
In: Appleyard et. al., *The View from the Road*, 1964

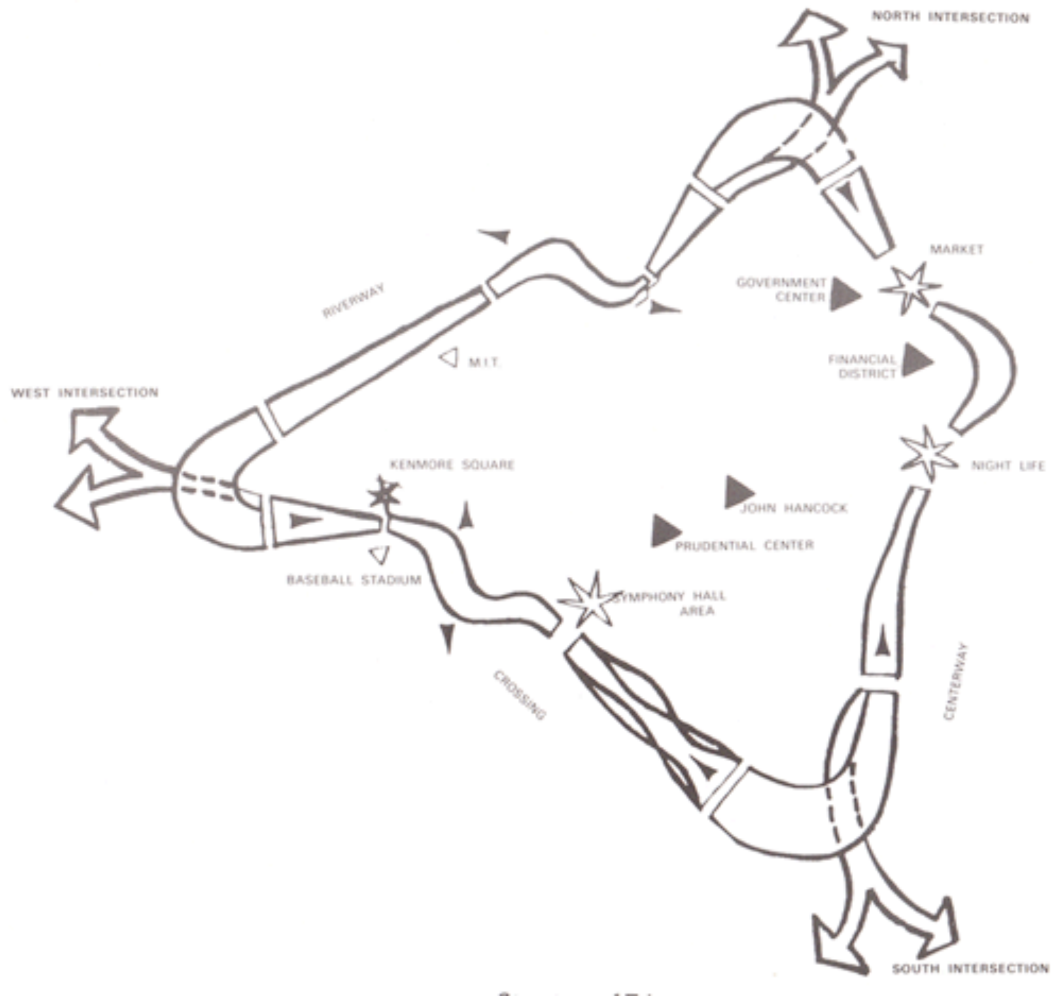


Fig. 4.28, Structure of Trip around Proposed Inner Belt Route
In: Appleyard et. al., *The View from the Road*, 1964

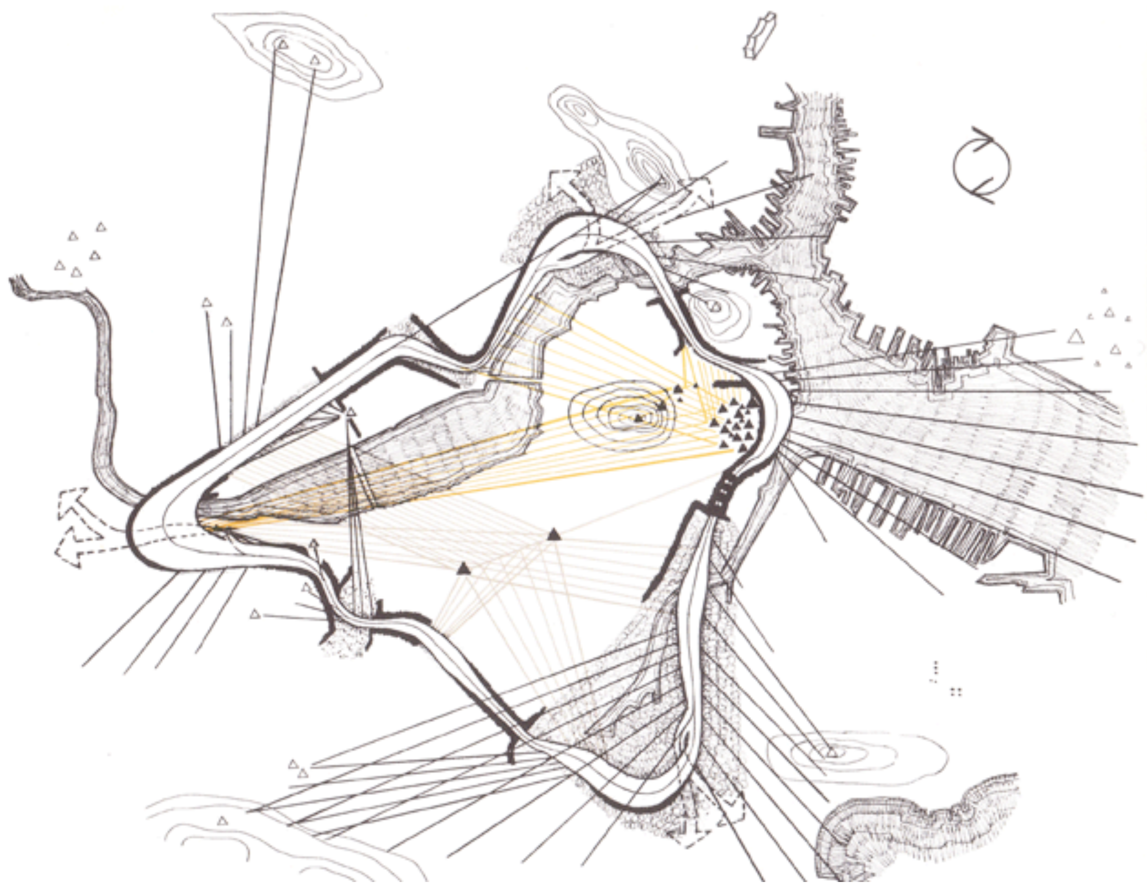


Fig. 4.29, View Diagram for clockwise travel around Proposed Inner Belt Route
Orange sightlines indicate views to older city center; Grey sightlines indicate views to newer city center
In: Appleyard et. al., *The View from the Road*, 1964

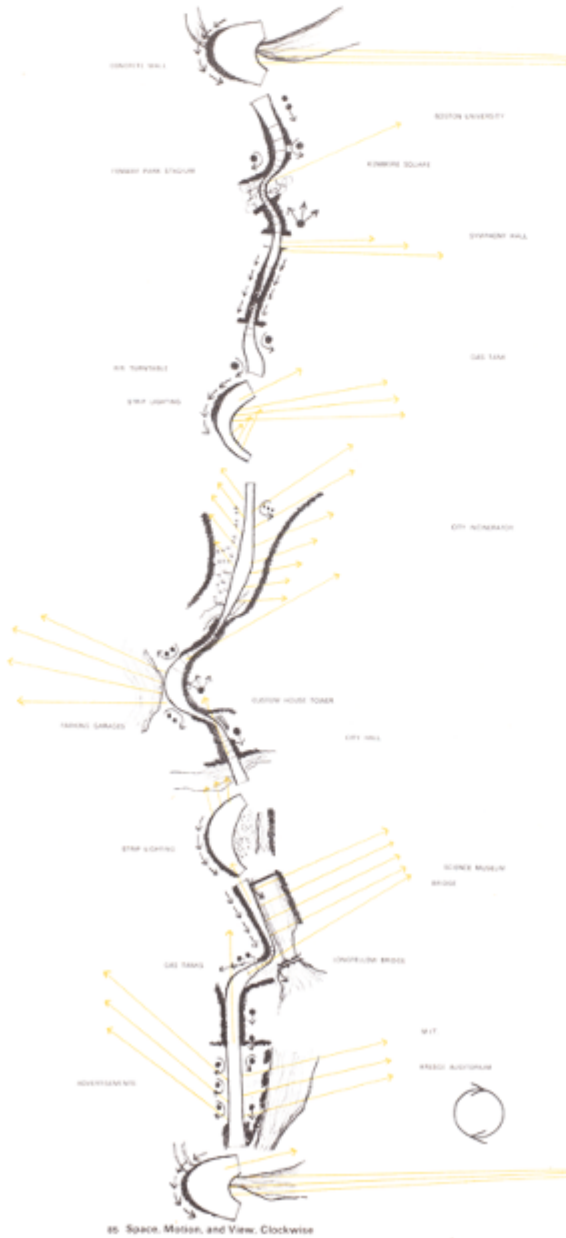


Fig. 4.30, Space Motion Notation
For clockwise travel around Proposed Inner Belt route
In: Appleyard et. al., *The View from the Road*, 1964

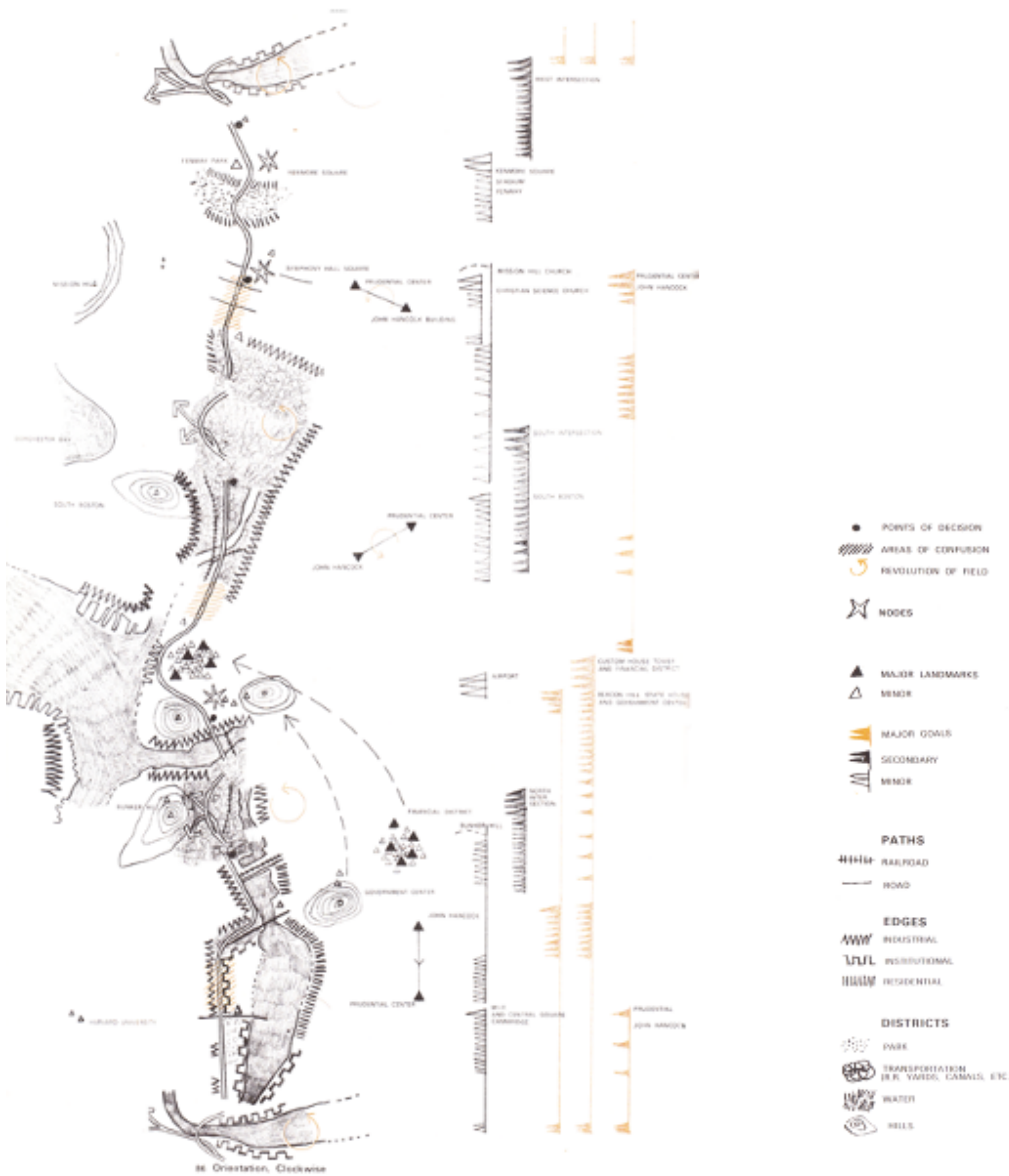


Fig. 4.31, Orientation Notation (and key)
For clockwise travel around Proposed Inner Belt route
In: Appleyard et. al., *The View from the Road*, 1964

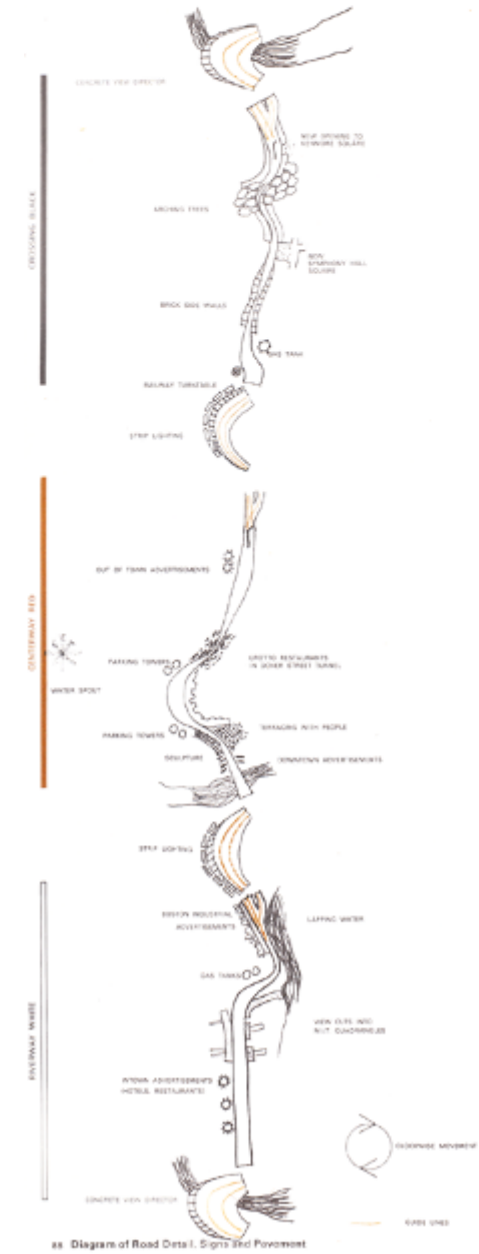


Fig. 4.32, Diagram of Road Detail, Signs and Pavement
For clockwise travel around Proposed Inner Belt route
In: Appleyard et. al., *The View from the Road*, 1964

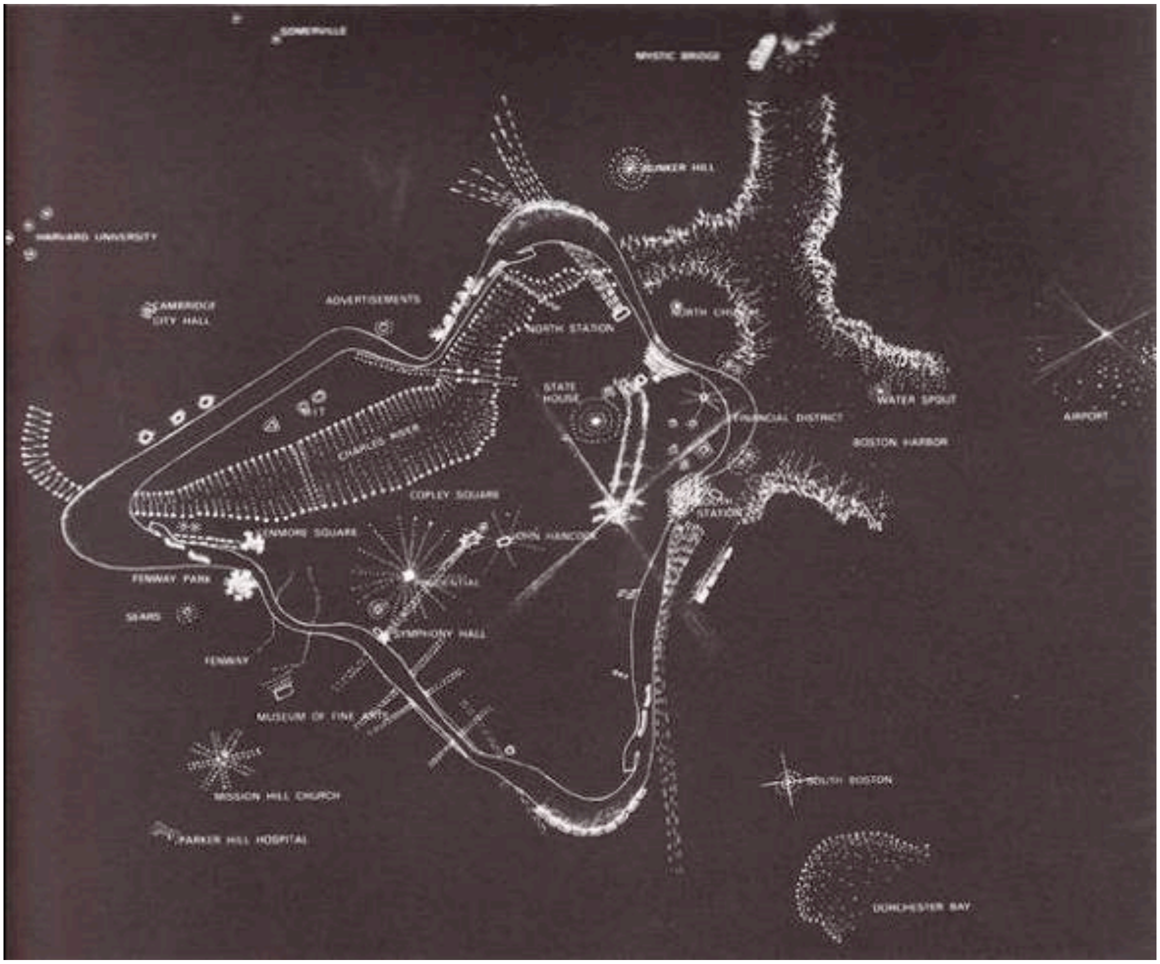
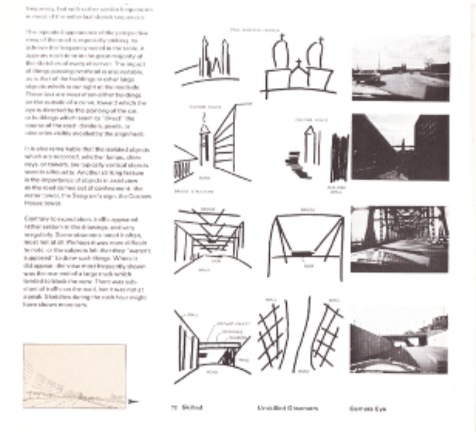


Fig. 4.33, Night Diagram showing illumination around Proposed Inner Belt route
In: Appleyard et. al., *The View from the Road*, 1964



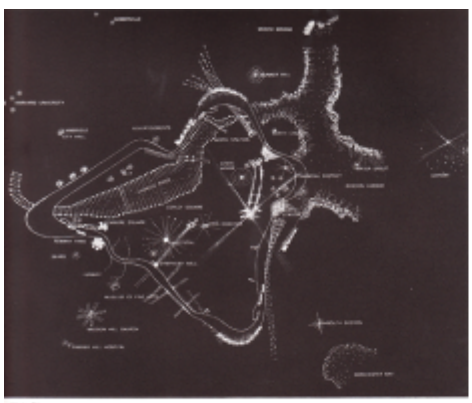


Fig. 4.34, Examples of perspective sketches included on bottom corners of book's pages
To give the "flip-card" experience of the journey around the Proposed Inner Belt Route
In: Appleyard et. al., *The View from the Road*, 1964

Fig. 4.35, Diagram showing Presumed Tempo of Attention
For clockwise travel around Proposed Inner Belt route
In: Appleyard et. al., *The View from the Road*, 1964

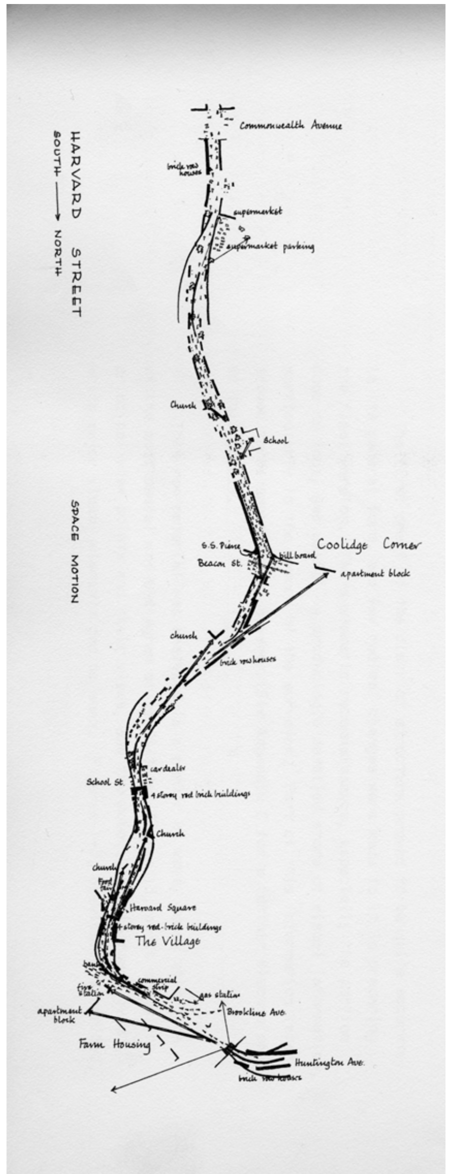


Fig 5.1, Space Motion notation (fig. 10 in Brookline Analysis)
In: Lynch, *Visual Analysis: Community Renewal Program, Brookline*, 1965

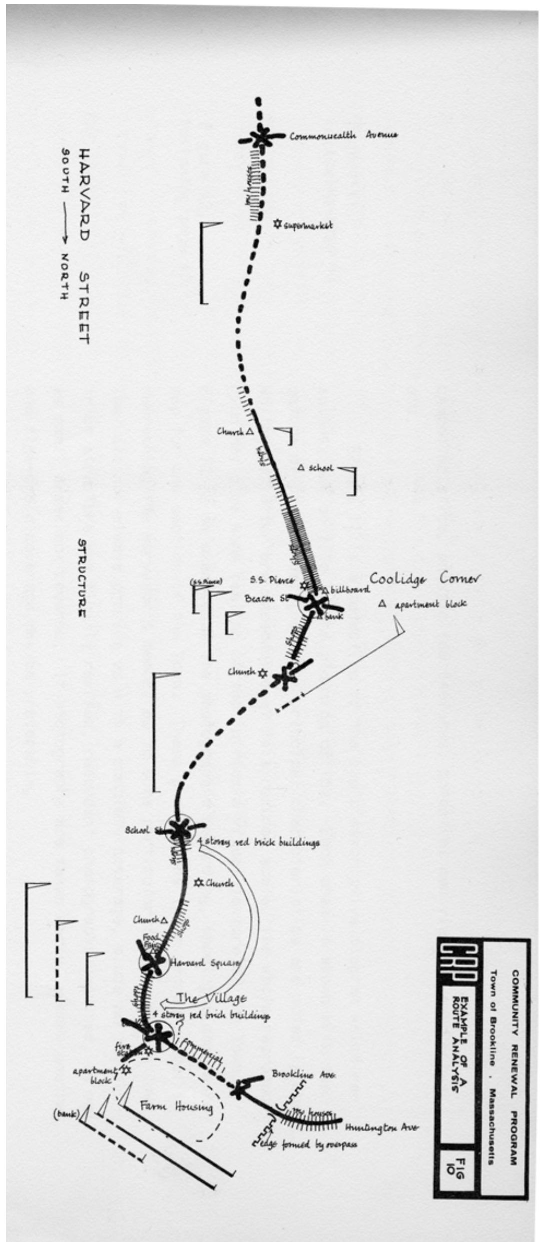
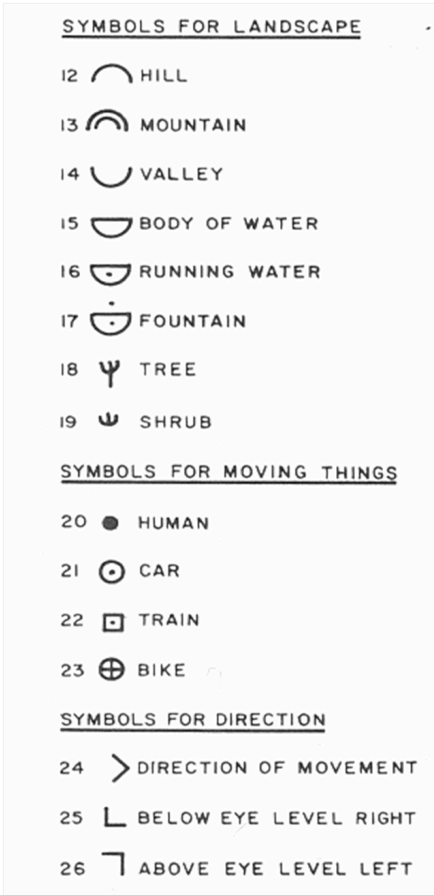
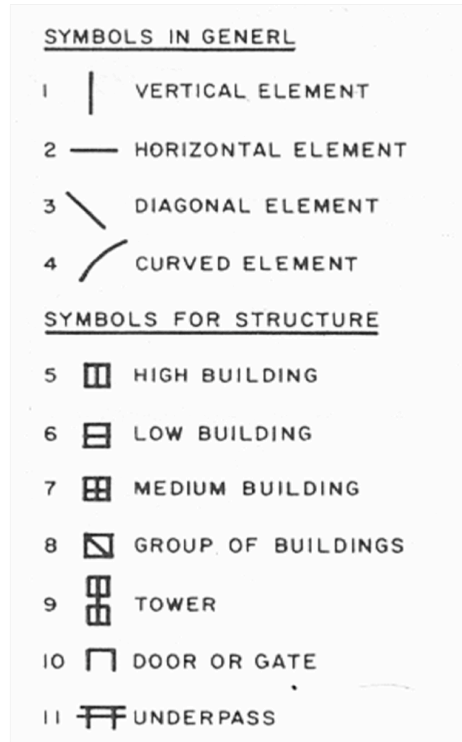


Fig. 5.2, Structure notation (fig. 10 in Brookline Analysis)
In: Lynch, *Visual Analysis: Community Renewal Program, Brookline*, 1965



Symbols



Symbols

Fig. 5.3, Lawrence Halprin, Symbols of “Motation,” *Progressive Architecture*, July 1965

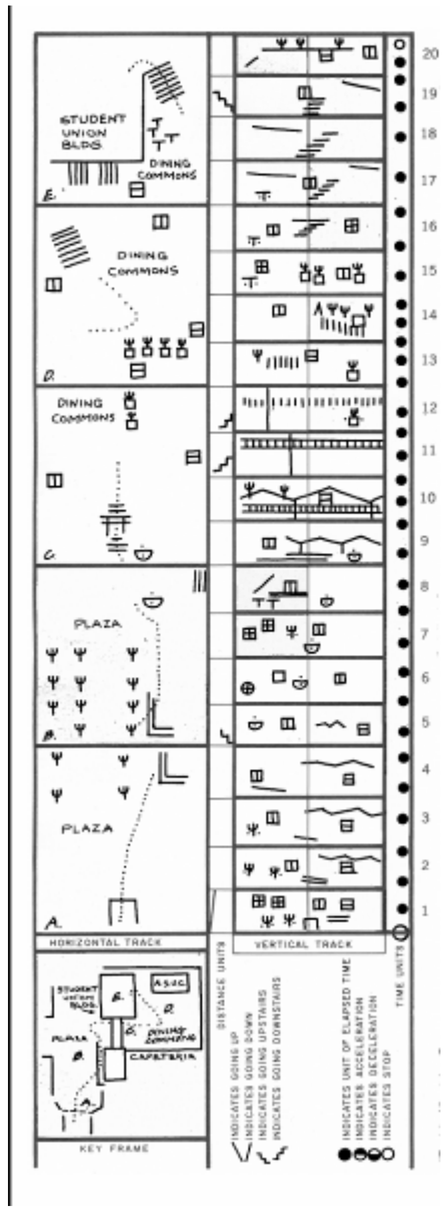
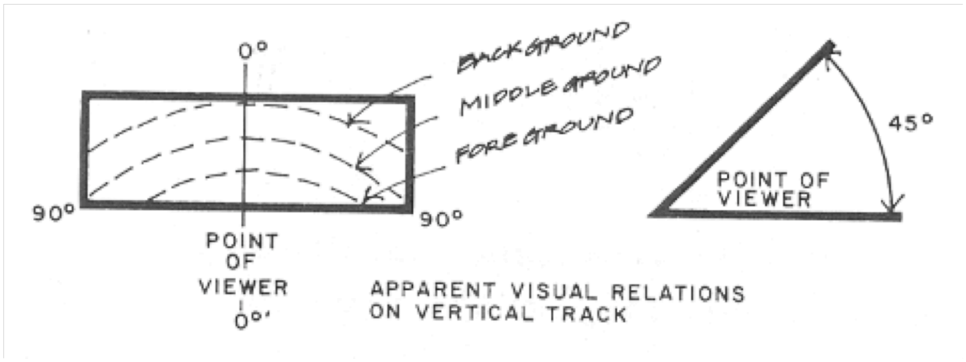
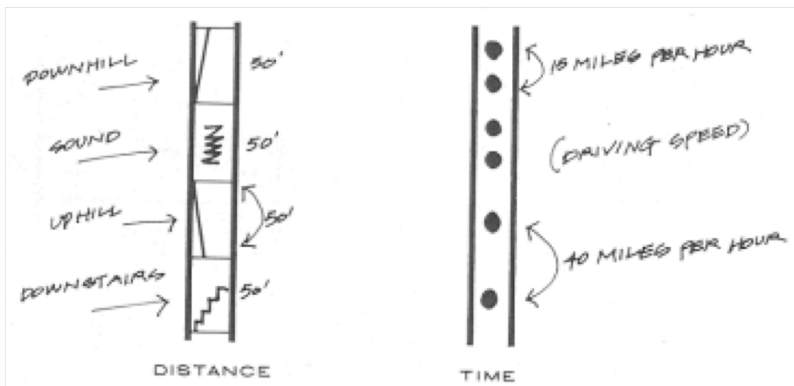


Fig. 5.4, Lawrence Halprin, “Motation,” *Progressive Architecture*, July 1965
Showing key frame & horizontal track in the left column and vertical track in the right column



Visual Relations on Vertical Track



Distance and Time Lines

Figs. 5.5-5.6, Lawrence Halprin, “Motation,” *Progressive Architecture*, July 1965

Fig. 5.7, Lawrence Halprin, "Motation," *Progressive Architecture*, July 1965
Snapshots of journey through Student Union Plaza, Berkeley

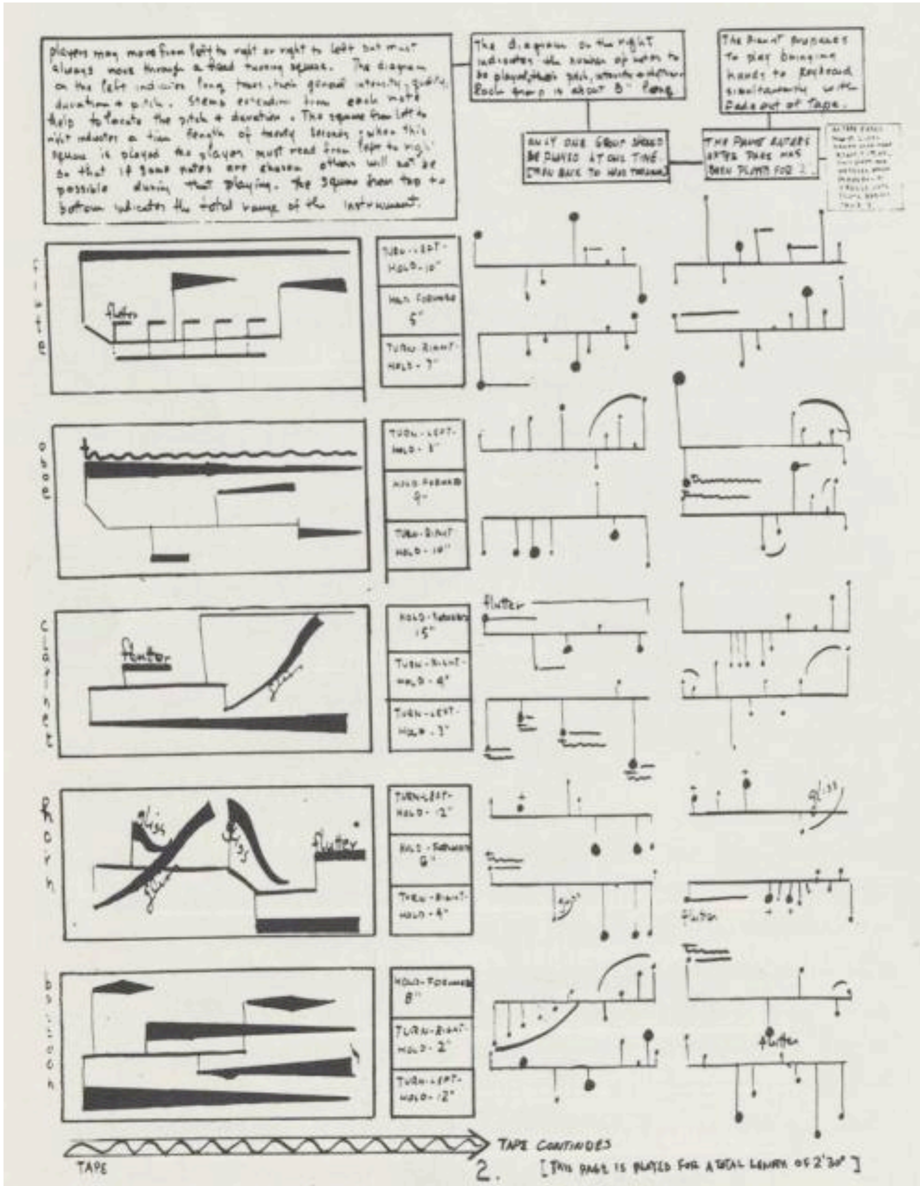


Fig. 5.8, Morton Subotnick, *Play! no. 1*, 1964
For woodwind quintet, tape, and piano; visual projections (not shown) by Tony Martin
From Lawrence Halprin, "Motation," *Progressive Architecture*, July 1965

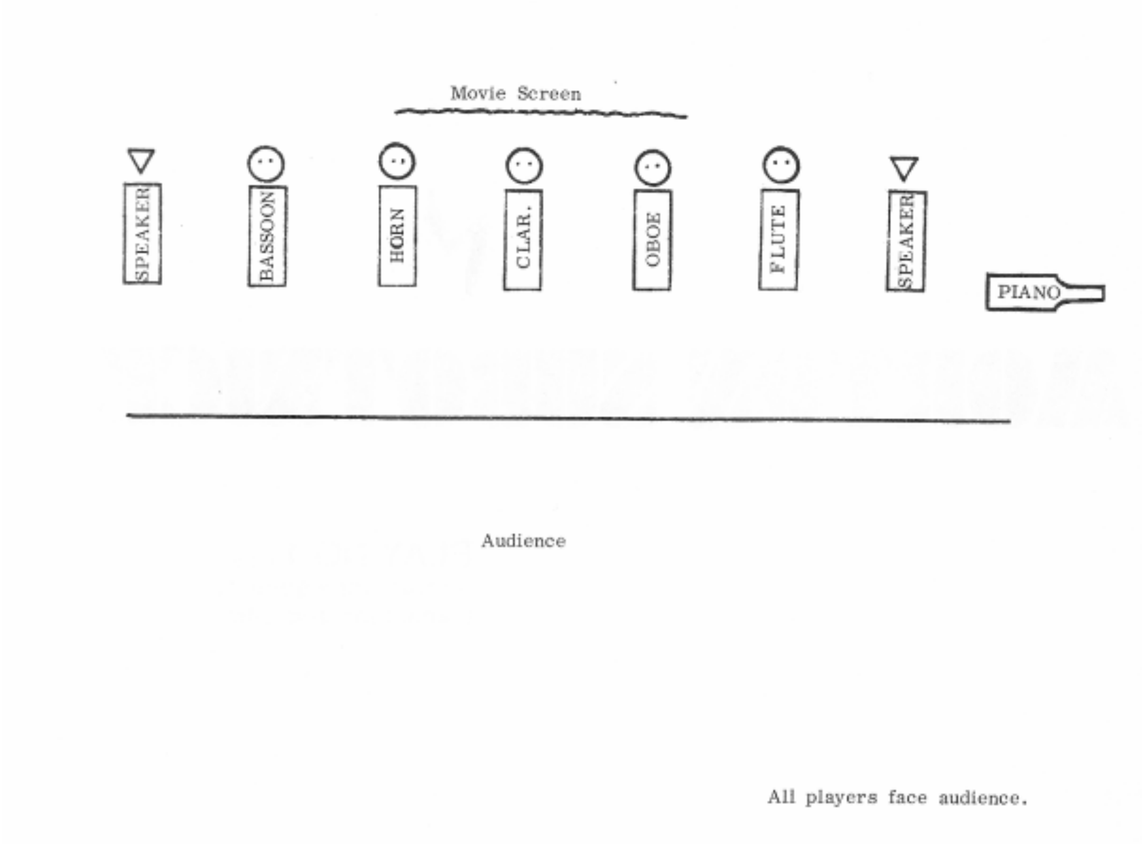
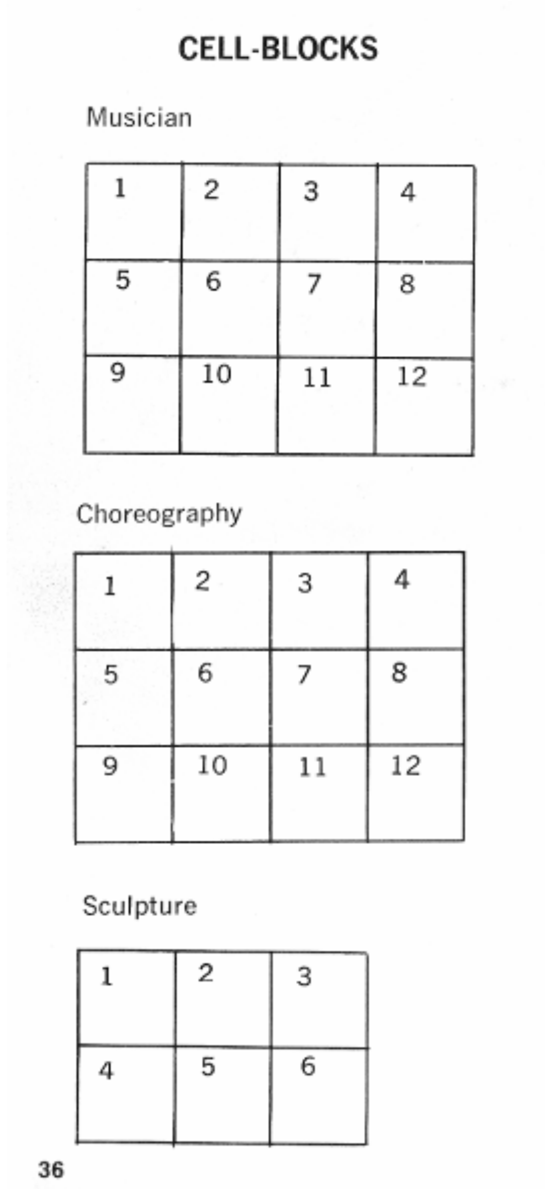


Fig. 5.9, Morton Subotnick, *Play! no. 1*, 1964
Stage Layout
From Subotnick, *Play no. 1* for woodwind quintet, piano, tape and film, 1964 (New York: MCA Music, 1971)

Fig. 5.10, Morton Subotnick, *Play! no. 1*, 1964
Photograph of Performance
From Bernstein, *The San Francisco Tape Music Center: 1960s Counterculture and the Avant-Garde*, 2008

Fig. 5.11, Lawrence and Ann Halprin
Above: in 1940; Below: in 2005
From Ross, *Anna Halprin: Experience as Dance*, 2007



CELL-BLOCKS

Musician

1	2	3	4
5	6	7	8
9	10	11	12

Choreography

1	2	3	4
5	6	7	8
9	10	11	12

Sculpture

1	2	3
4	5	6

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Fig. 5.12, Ann Halprin, Parades & Changes, 1965
Cell block choreography concept
From Halprin, *RSVP Cycles*, 1969

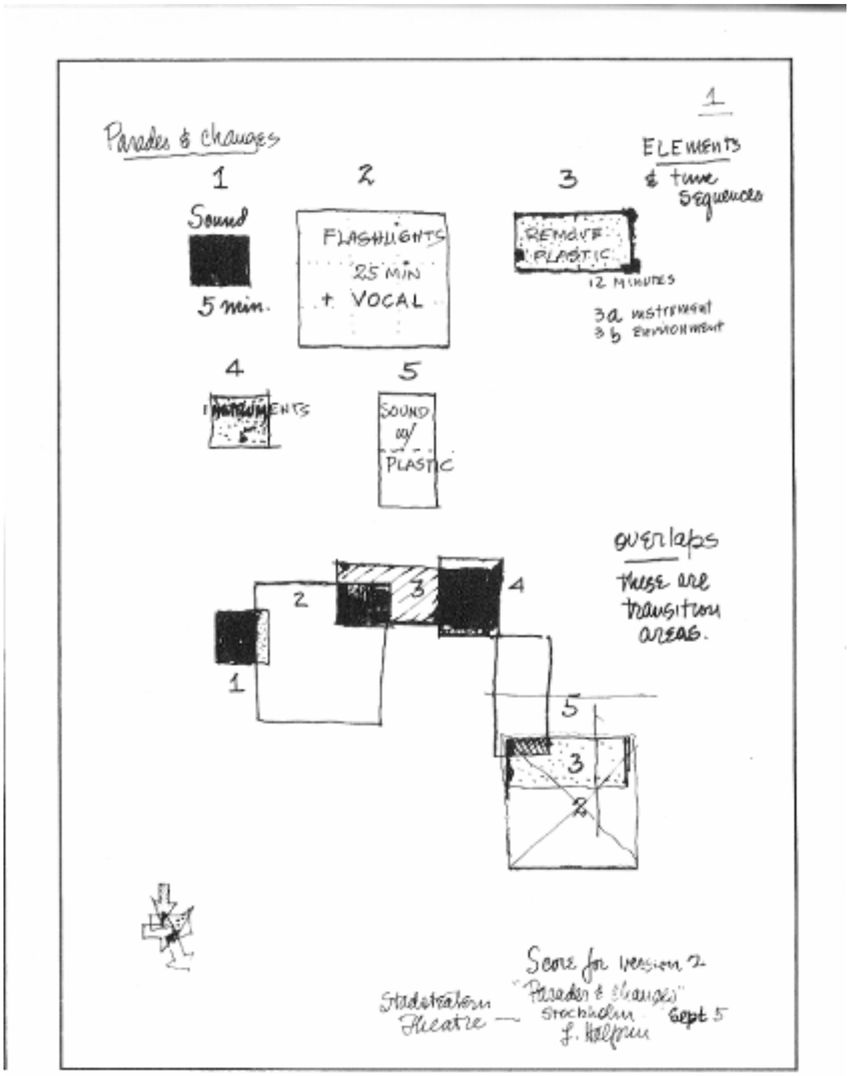

Fig. 5.13, Lawrence Halprin, Notes and Score for *Parades and Changes*, 1965
From *The Notebooks of Lawrence Halprin, 1959-1971*, 1972

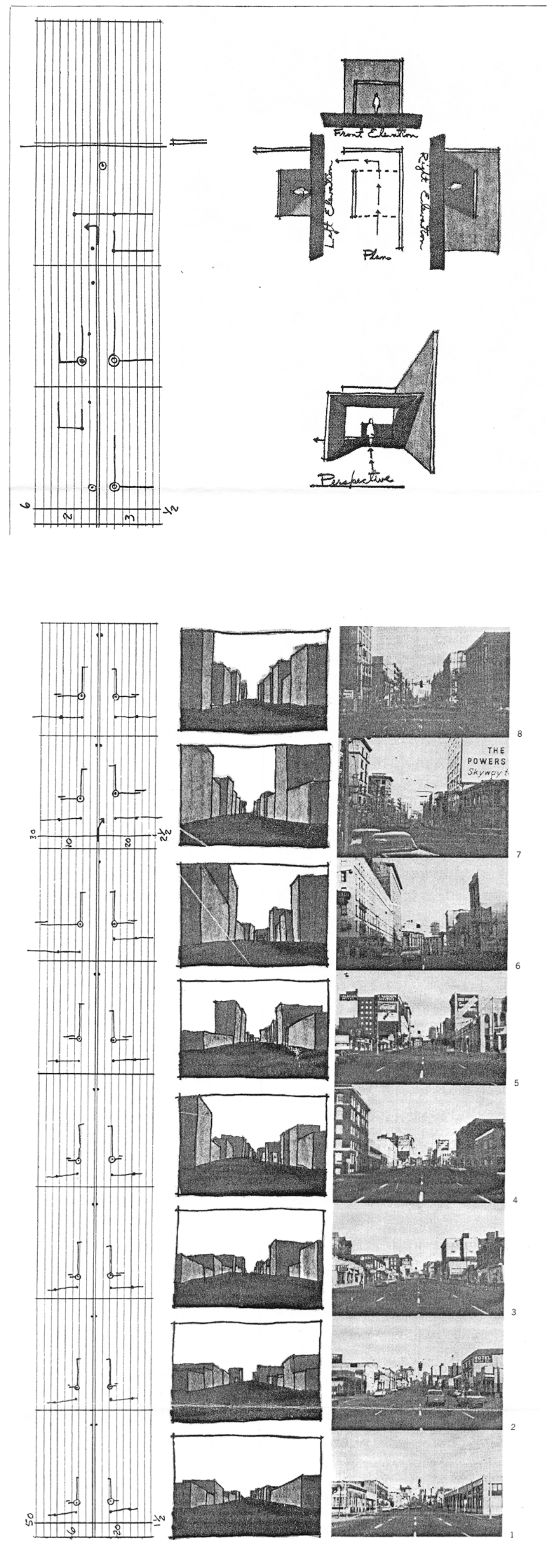

Fig. 6.1, Stuart Rose, Space Notation System for Computer Inputs
In: Rose, "On Beyond Models: Notation System Simulates Space," *Architectural & Engineering News*, 1968

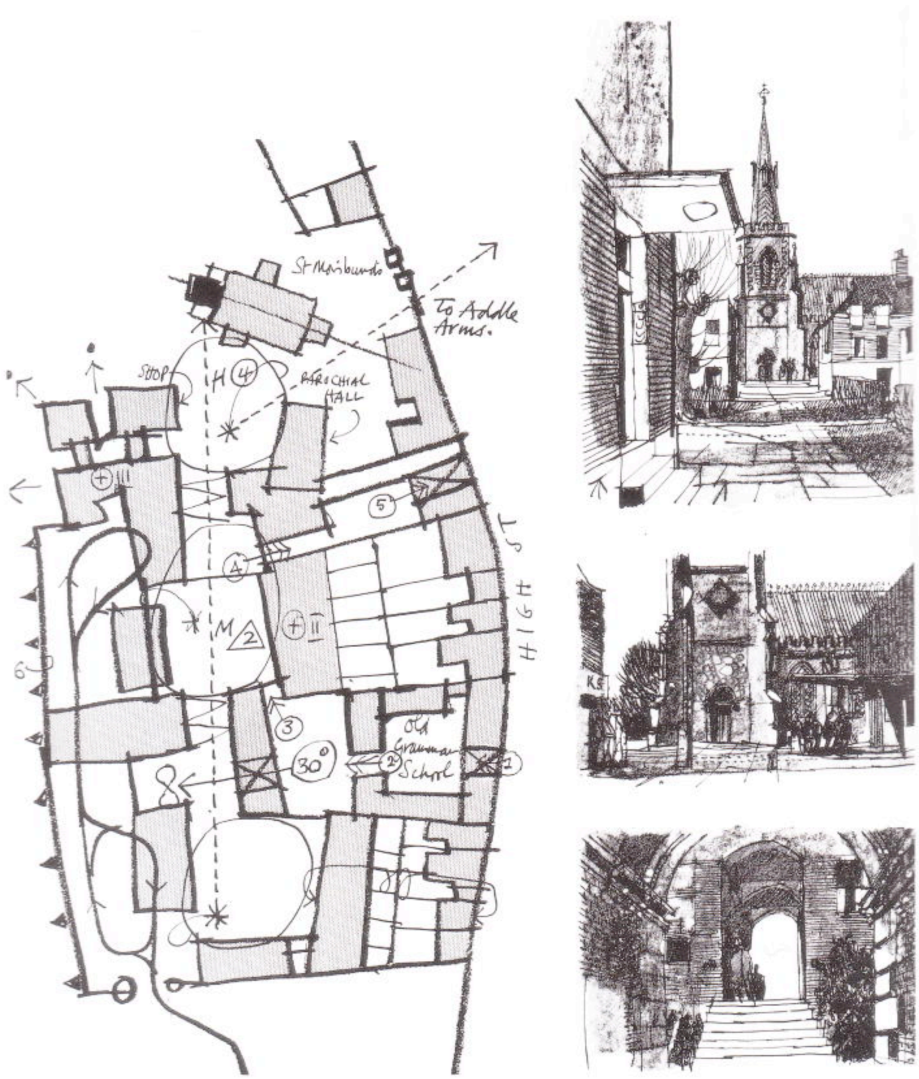

Fig. 6.2, Gordon Cullen, “Notation: An Observant Layman’s Code…”, 1968
In: Gosling, *Gordon Cullen: Visions of Urban Design*, 1996

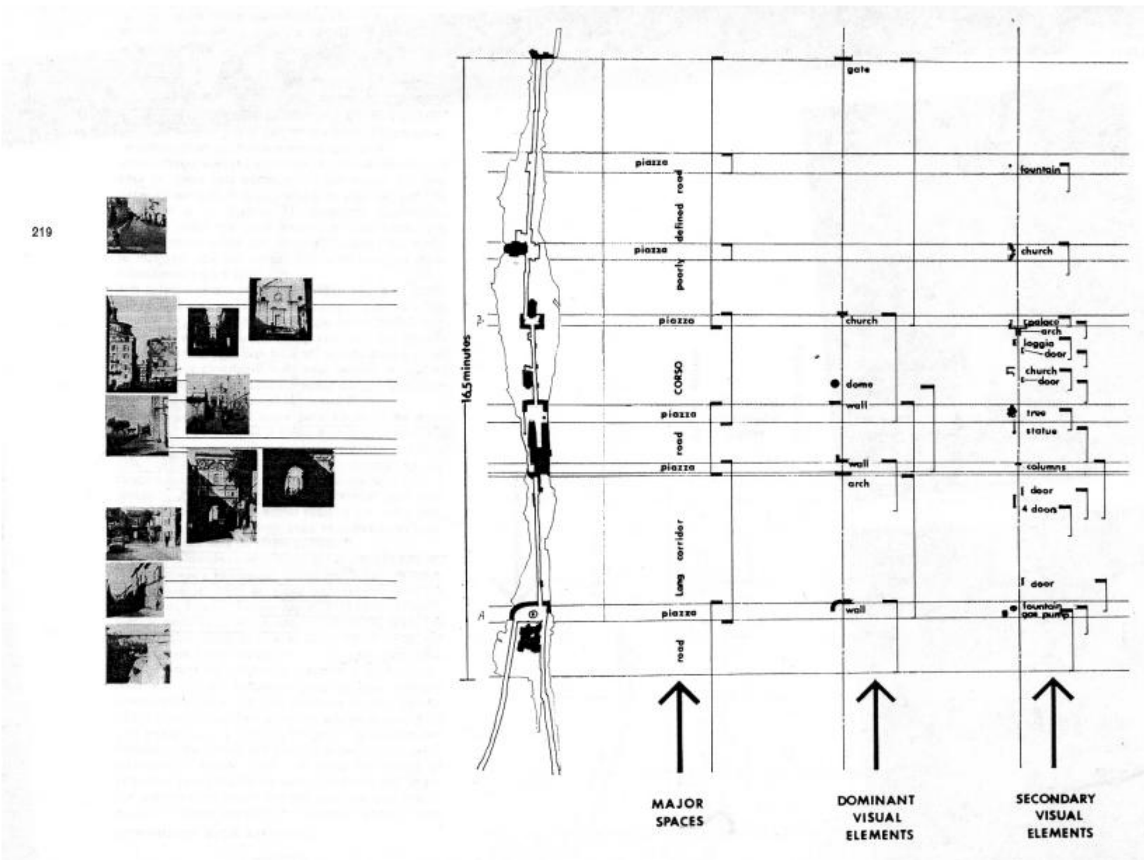

Fig. 6.3, Raymond Gindroz, "Studies in Visual Structure for Urban Environments," 1968
In: Lewis, *Urban Structure*, 1968

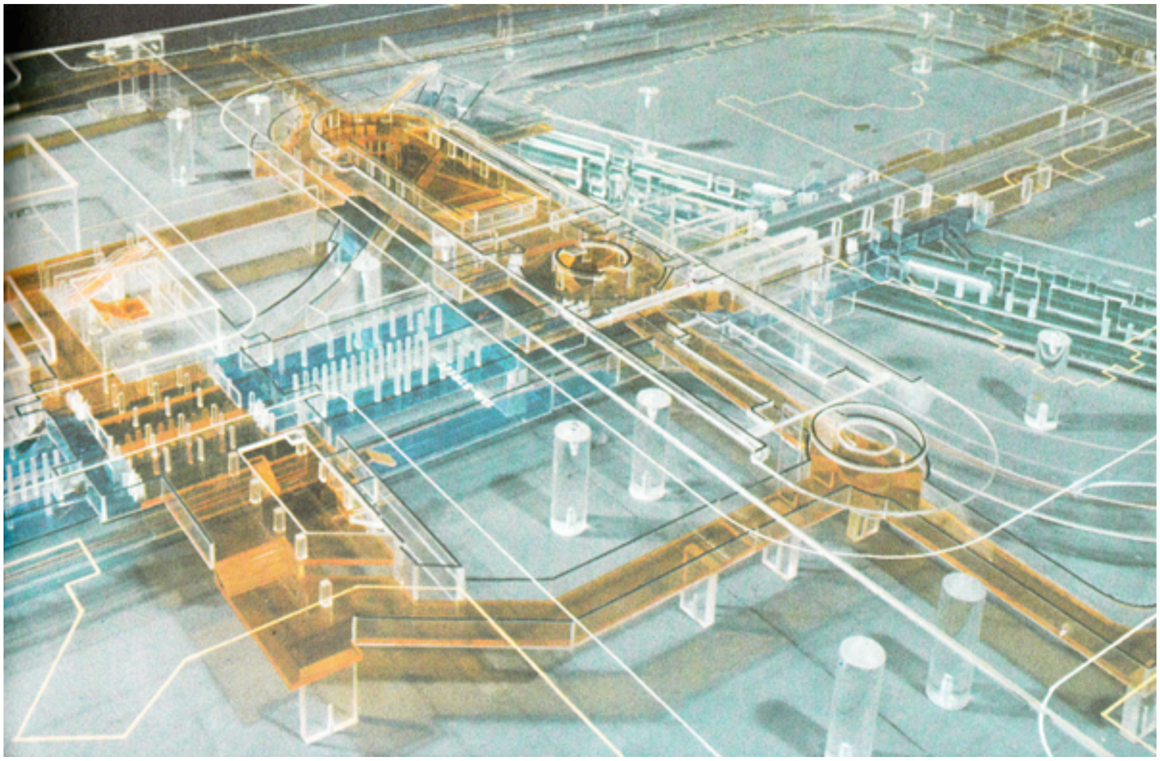

Fig. 6.4, Bacon, Layered model of “Simultaneous Movement Systems,” Philadelphia Penn Center Proposal
Showing pedestrian paths in brown and subway/subway surface lines in blue
In: Bacon, *Design of* Cities, 1967

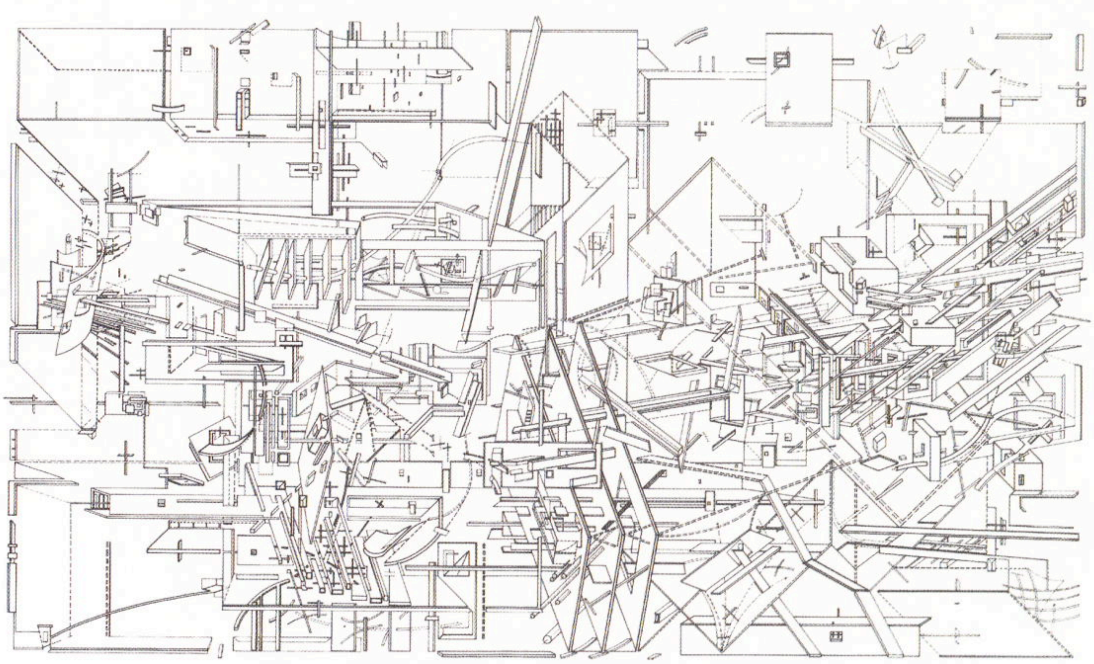

Fig. 6.5, Daniel Libeskind, “Micromegas Project,” 1979
In: McQuaid, *Envisioning Architecture*, 2002

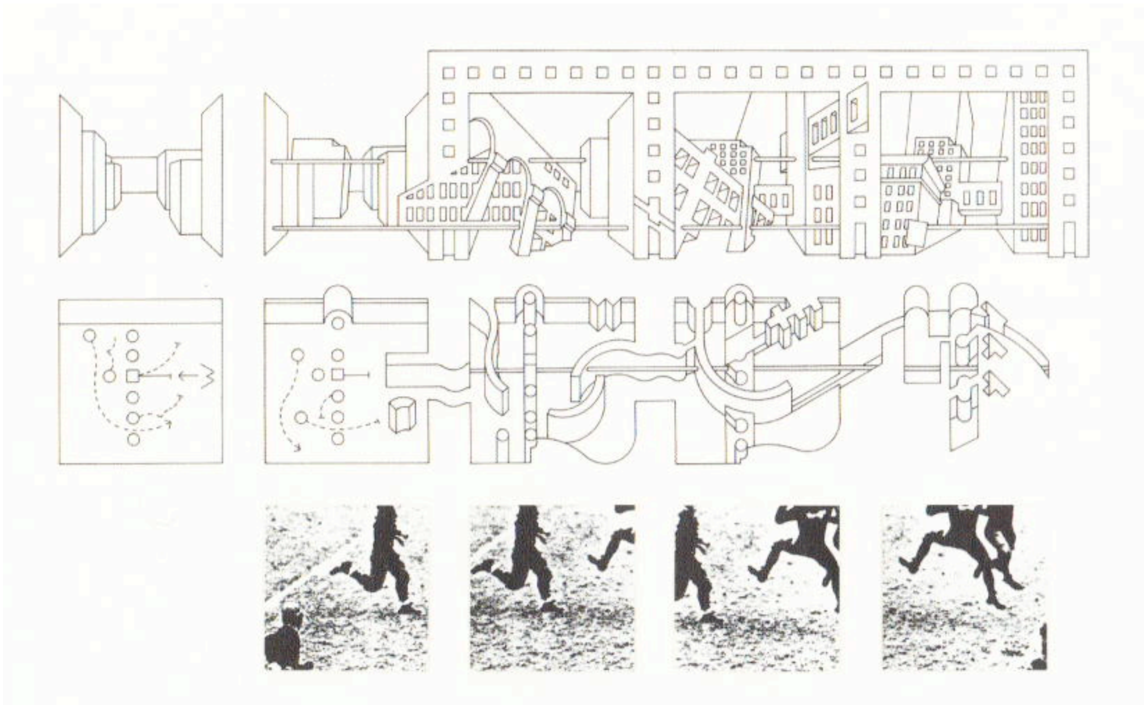

Fig. 6.6, Bernard Tschumi, “Manhattan Transcripts,” 1976-81
In: McQuaid, *Envisioning Architecture*, 2002

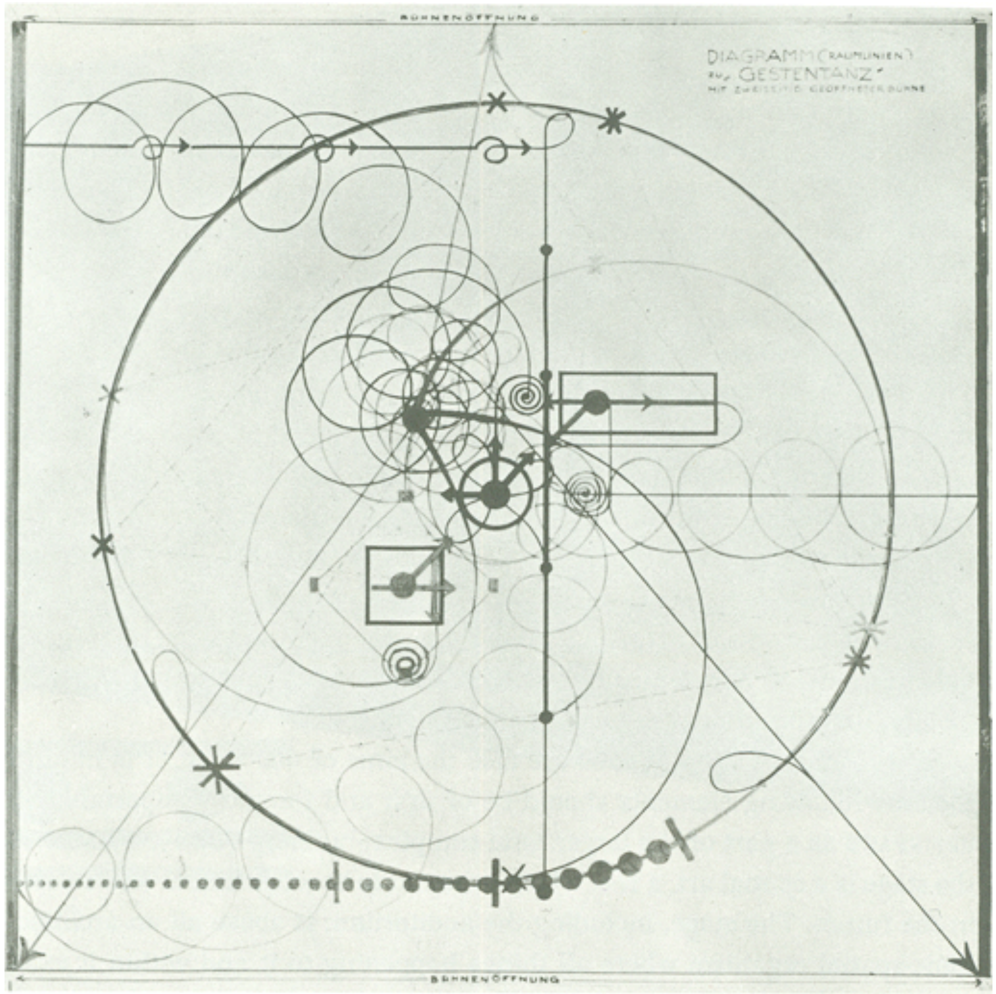

Fig. 6.7, Oskar Schlemmer, Diagram of the Gesture Dance
In: Gropius, *The Theater of the Bauhaus*, 1924/1996

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