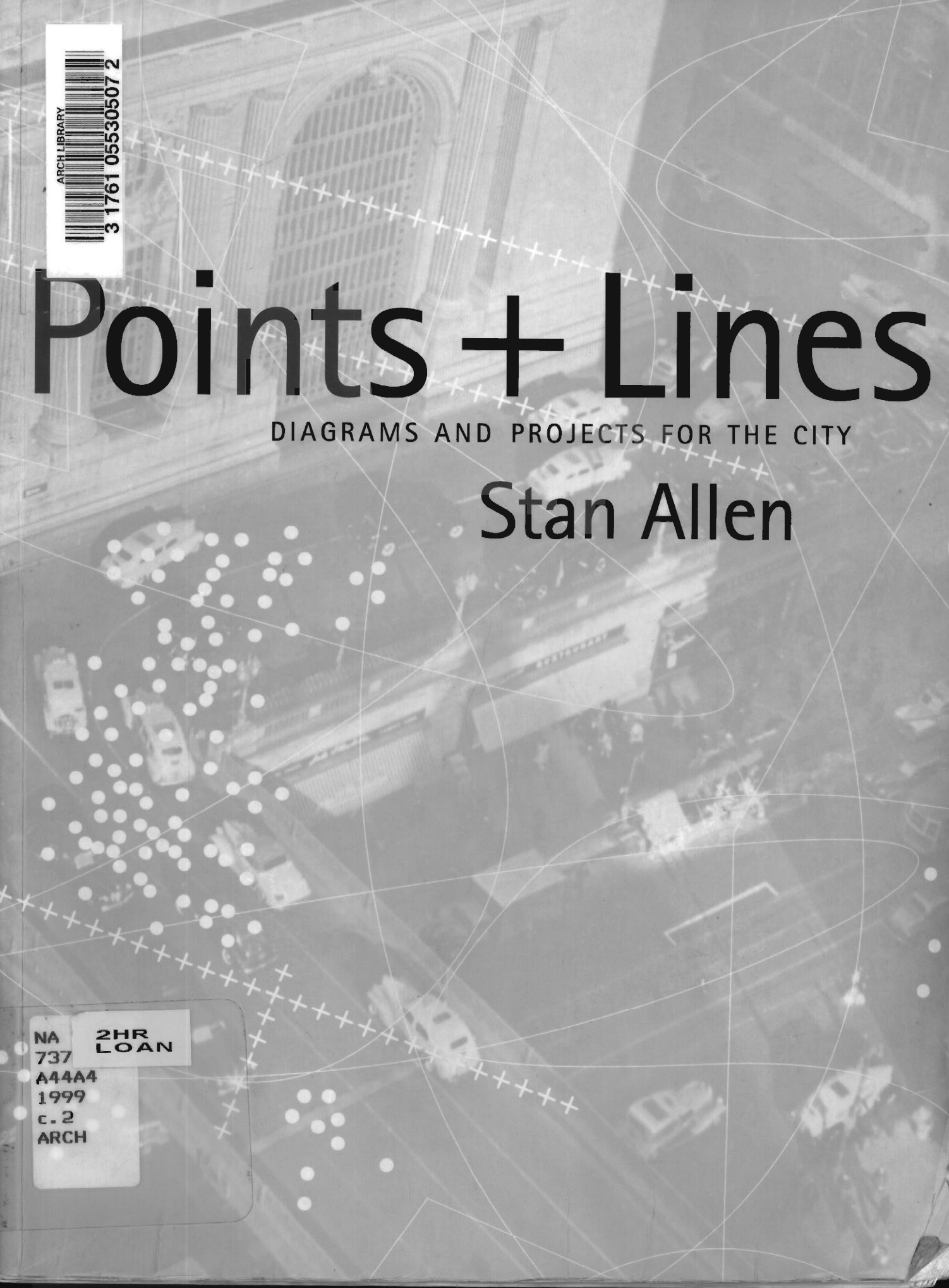

Points + Lines

DIAGRAMS AND PROJECTS FOR THE CITY

Stan Allen

"As an active critic and promoter of both his predecessors and contemporaries, it is quite possible that no one has a broader understanding of international design practices today than Stan Allen."

R. E. SOMOL

With *Points + Lines: Diagrams and Projects for the City* influential architect and theorist Stan Allen proposes a series of new architectural strategies for the contemporary city. Organized in the form of a user's manual, it juxtaposes texts outlining Allen's theoretical principles with his projects, in which those principles are demonstrated in practice.

Finding inspiration in the artistic minimalism and postminimalism of the 1970s, Allen uses the city's vitality and infrastructure to support projects that reflect and augment the urban experience. Included in this volume are three essays by Allen along with six projects, including his designs for the Cardiff Bay Opera House in Wales, the Museo del Prado in Madrid, the *Souks* of Beirut, the Logistical Activities Zone of Barcelona, the Korean-American Museum of Art in Los Angeles, and the National Diet Library in Kansai Kan, Japan. Allen's work is introduced by K. Michael Hays; R. E. Somol provides an afterword. In addition, the book contains a complete, illustrated chronology of Allen's projects.

STAN ALLEN is a New York-based architect and a professor at the Columbia University Graduate School of Architecture, Planning and Preservation.

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BACKROUND: fiction/nonfiction Gallery, New York, 1991

Points+

Stan Allen

Princeton Architectural Press New York

Lines

DIAGRAMS AND PROJECTS FOR THE CITY

Infrastructural

"Think only of essentials: the physics of the gyroscope, the flux of

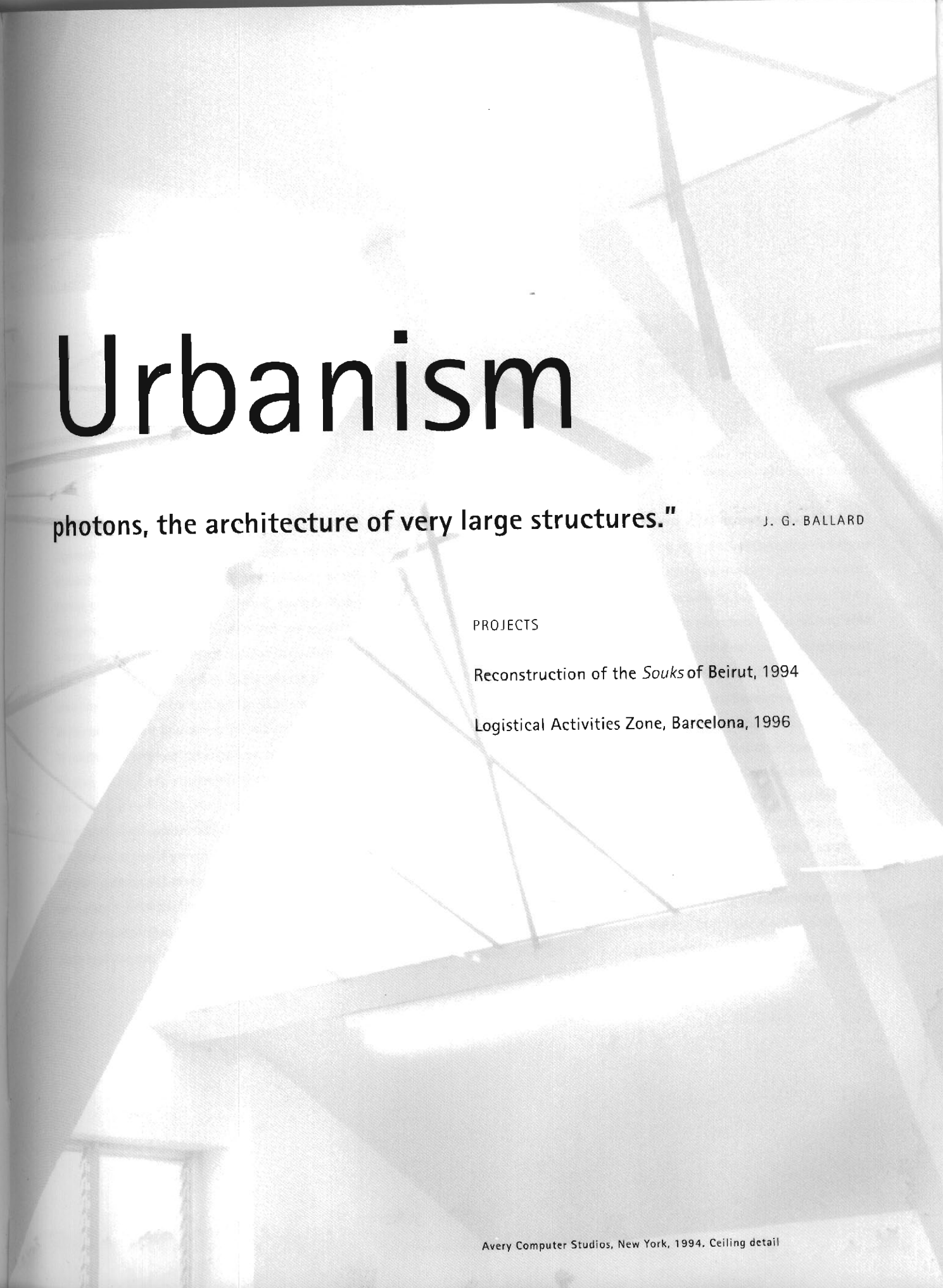
Urbanism

photons, the architecture of very large structures." J. G. BALLARD

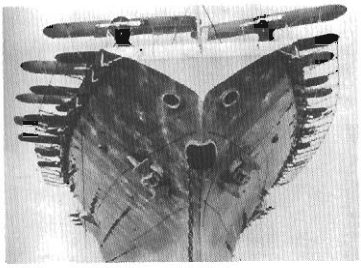
PROJECTS

Reconstruction of the *Souks* of Beirut, 1994

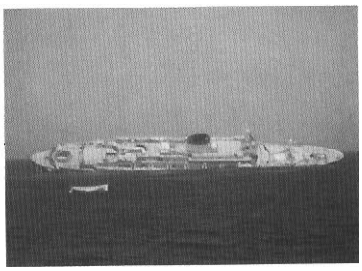
Logistical Activities Zone, Barcelona, 1996



Avery Computer Studios, New York, 1994. Ceiling detail



Aircraft Carrier USS *Lexington*



Liner Andrea Doria aground off Nantucket, 1956

I start with a sequence of three images spanning six decades of the twentieth century:

FIRST IMAGE: the bow of an aircraft carrier, shot from below. The bulk of the craft looms over an invisible horizon, a blank open-mouthed face stares back at the viewer. Published in 1935, in a collection edited by Le Corbusier, the caption reads: "Neptune rises from the sea, crowned with strange garlands, the weapons of Mars."[1] This photograph of the American aircraft carrier *USS* Lexington stands for a moment in which the technical and the aesthetic formed a unified whole. It presents the instrumentality of advanced engineering design and the organization of the forces of production that made construction at this scale possible—processes inescapably linked to the war machine—as fully integrated into a meaningful cultural and aesthetic framework, even to the point of establishing continuity with classical mythology.

SECOND IMAGE: the liner Andrea Doria foundering off the coast of Nantucket in 1956 (taken over twenty years after the first image, still closer in time to the heady world of prewar modernism than to our cynical end-of-century postmodernism). Recalling the iconic status of the liner in the theories of modern architecture, this image could be emblematic of the foundering of the modernist project in the postwar era. By 1956, under the shadow of the Cold War, the modernist dream of an integration of technology and aesthetics was no longer believable. The social and technical forces of modernity were about to become detached from the production of images, both in popular and high culture.

THIRD IMAGE: B-24 bomber factory in Fort Worth, Texas. This aerial view of the factory floor documents the implementation of the modernist dream of rational production under the pressures of the wartime economy: the precise calibration of material, bodies, and time that allowed such incredibly efficient production—"on the front line, and on the production line," as the promotional copy

B-24 Bomber Factory, Fort Worth, Texas, 1944

says. "One B-24 Bomber every four hours": a mechanical ballet performed in this limpid space of production. The space is the exact counterpart to the rational machines produced within it, organized by the infinite perspective of a perfect panoptic transparency, sheltered by the rational tectonics of the factory structure itself. However, it is important to note that this image appears not in its original 1940s context, but in the early 1990s, illustrating an advertisement to raise money for the reconstruction of a *single* B-24 bomber for exhibition purposes. As such, it marks a shift from technologies of production to technologies of reproduction and display. If the factory floor is the ideal space of early modernism, then the museum is the emblematic space postmodernity.

It is this perceived failure of the modernist project that serves to legitimate the subsequent turn toward a postmodern culture of abstract signs and surfaces without depth. In architecture, the consequence of the shift from technologies of production to technologies of reproduction was given expression as an architecture that produced meaning by the grafting of conventional signs onto a neutral technical frame. These images mark a shift from models of formal organization and meaning that work with transparency and depth, to a condition of shallow surfaces, in which meaning resides in graphic information lying on the surface.

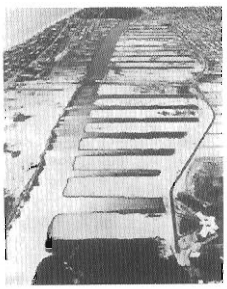
But is it not equally plausible to conceive of this shift not as modernism's failure, but as a paradoxical success? Modernity tended toward abstract systems of exchange and serial production. The passage from concrete, material things to ephemeral signs—the dissolution of objects into flows of information—was in many ways already anticipated by the abstract logics of modernity itself. However, the particular form that this transformation takes is not anticipated, nor can it ever be fully controlled from within modernism. Some reassessment is required.

Postmodernism in architecture is usually associated with a rediscovery of architecture's past. However, an equally important shift preceded and in many ways underwrote the postmodern turn to history at the end of the sixties.[2] Postmodernism responded not only to a call to re-inscribe architecture into history, it also

responded to a contemporary demand for *meaning* in architecture. History provided a ready-made catalog of "meaningful" forms, but in order for the past to be appropriated and utilized, it had to be detached from its original context and converted into a sign. More than historical reference, it is the presence of this semiotic/structuralist model that identifies postmodernism in architecture. But once architecture's signifying capacity had been opened up, no limit could be placed on signified content. "History" is but one of the many things that a semiotic architecture can signify.

This turn toward a semiotic architecture at the end of the sixties and the beginning of the seventies has itself been subject to intense critical scrutiny—from both a formal and an ideological point of view. But even the most radical critiques have left the fundamental assumption that architecture behaves like a discursive system intact. Deconstruction's radical claim to contest the very possibility of meaning in architecture, for example, was a claim carried out over the territory of meaning and representation, and pays little attention to architecture's instrumentality, or to the complex traffic between representation and materiality. Meaning today may be multiple, contested, contaminated, and partial, but meaning is still the issue.

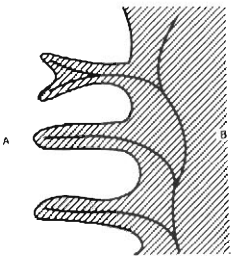
Nevertheless, an architecture that works exclusively in the semiotic register and defines its role as critique, commentary, or even "interrogation" (laying bare of the intricacies of architecture's complicity with power and politics) has, in some fundamental way,

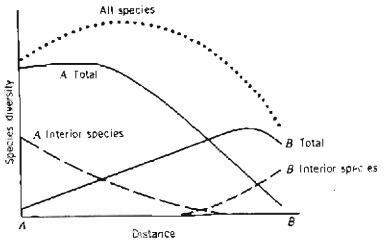


Intercoastal Waterway, Fort Lauderdale, Florida, 1956–57

given up on the possibility of ever *intervening* in that reality. Under the dominance of the representational model, architecture has surrendered its capacity to imagine, to propose, or to construct alternative realities. As Robin Evans has remarked, a building was once "an opportunity to improve the human condition;" now it is conceived as "an opportunity to express the human condition."[3] Architecture is understood as a discursive system that expresses, critiques, or makes apparent the hard realities of a world that is held safely at arm's length.

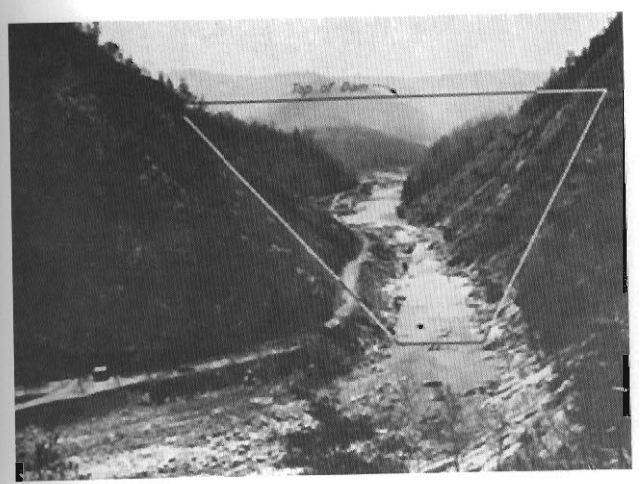
One effect of this shift toward images and signs is that architecture's disciplinary frame shifts. It finds itself in competition with other discursive media—painting, film, literature, the Internet, performance art—a field in which architecture often seems to come up short. What these other media lack, of course, is architecture's powerful instrumentality—its capacity not only to critique, but also to actually transform reality. Architecture's relationship to its material is, however, indirect. Unlike activities such as gardening or woodworking, where something concrete is made by direct contact





RIGHT: Richard T. T. Foreman, landscape ecology diagrams

BELOW: Watauga Dam (Tennessee Valley Authority), proposed location, 1946



with the material, the architect (like the engineer, the urbanist, or the ecologist) operates on reality at a distance, and through the mediation of abstract systems such as notation, projection, or calculation. Indirect contact is the necessary counterpart to the larger scale of intervention. Architecture works simultaneously with abstract images and with material realities, in complex interplay. It is a *material* practice .

It is not entirely coincidental that the twenty-five year period coinciding with the rise of postmodernism in architecture has seen a massive defunding of urban infrastructure. In the United States, public investment in civic works—highways, railroads, water supply and control, land reclamation, mass transit—is at an all time low. While architects cannot logically be held accountable for these complex political and economical shifts, it might be argued that by the production of a theoretical framework to justify an architecture of surface and sign, architects have, consciously or not, participated in their own marginalization. If architects assert that signs and information are more important than infrastructure, why would bureaucrats or politicians disagree? As much as they have been excluded from the development of the city, architects themselves have retreated from questions of function, implementation, technique, finance, and material practice. And while architects are relatively powerless to provoke the changes necessary to generate renewed investment in infrastructure, they *can* begin to redirect their own imaginative and technical efforts toward the questions of infrastructure. A toolbox of new and existing procedures can be

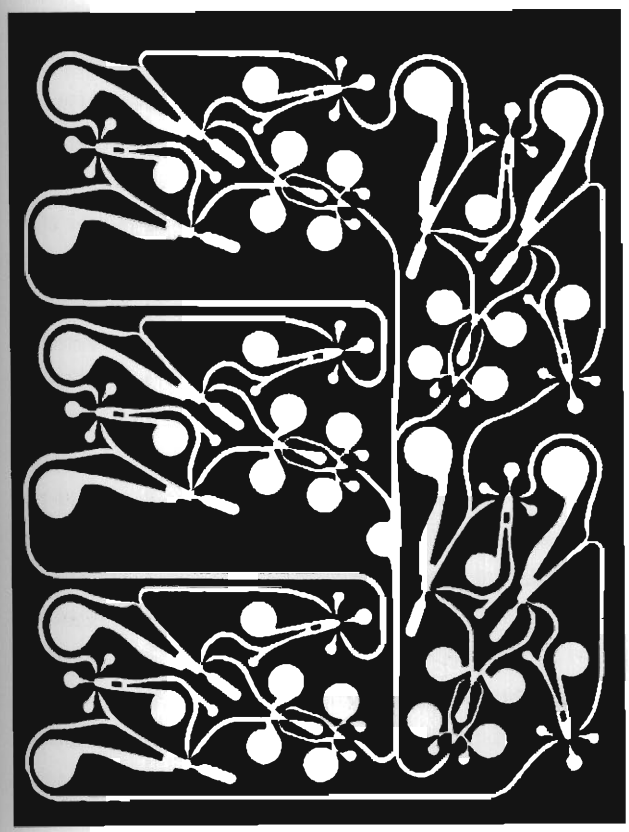
expanded by reference to architecture's traditional alliance with territorial organization and functionality.

This is the context within which I want to situate the shift in recent practice toward infrastructure. Going beyond stylistic or formal issues, infrastructural urbanism offers a new model for practice and a renewed sense of architecture's potential to structure the future of the city. Infrastructural urbanism understands architecture as *material* practice—as an activity that works in and among the world of things, and not exclusively with meaning and image. It is an architecture dedicated to concrete proposals and realistic strategies of implementation and not distanced commentary or critique. It is a way of working at the large scale that escapes suspect notions of master planning and the heroic ego of the individual architect. Infrastructural urbanism marks a return to instrumentality and a move away from the representational imperative in architecture.

This does not imply a simple return to the now discredited certainties of modernism. Two claims can be made: first, that architecture's instrumentality can be reconceived—not as a mark of modernity's demand for efficient implementation but as the site of architecture's contact with the complexity of the real. By immersing architecture in the world of things, it becomes possible to produce what Robin Evans, paraphrasing Lyotard, has referred to as a "volatile, unordered, unpoliceable communication that will always outwit the judicial domination of language."[4] The second claim is for a practice engaged in time and process—a practice not devoted to the production of autonomous objects, but rather to the production of directed fields in which program, event, and activity can play themselves out.

In an interview conducted fifteen years ago, Michel Foucault noted that "Architects are not the engineers or technicians of the three great variables: territory, communication and speed."[5] While it is hard to argue Foucault's point as an assessment of the current condition, it deserves to be pointed out that historically this has not been the case. Land surveying, territorial organization, local ecologies, road construction, shipbuilding, hydraulics, fortification, bridge building, war machines, and networks of communication and transportation were all part of the traditional competence of the architect before the rise of disciplinary specialization. Territory, communication, and speed are properly *infrastructural* problems, and architecture as a discipline has developed specific technical means to deal effectively with these variables. Mapping, projection, calculation, notation, and visualization are among architecture's traditional tools for operating at the very large scale. These procedures can be reclaimed for architecture, and supplemented with new technologies of design and simulation now available.

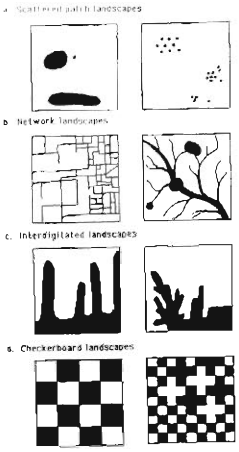
But rethinking infrastructure is only one aspect of a larger move away from the representational model, one of the many implications of architecture understood as a *material practice*. Material practices (ecology or engineering for example) are concerned with the behavior of large scale assemblages over time. They do not work primarily with images or meaning, or even with



Computer flow diagram

objects, but with *performance*: energy inputs and outputs, the calibration of force and resistance. They are less concerned with what things look like and more concerned with what they can do. Although these material practices work instrumentally, they are not limited to the direct manipulation of given material. Instead they project transformations of reality by means of abstract techniques such as notation, simulation, or calculation. Material practices organize and transform aggregates of labor, materials, energy and resources, but they work through necessarily mediated procedures—operations of drawing and projection, for example that leave their trace on the work. Material practices deploy an open catalog of techniques without preconceived formal ends.

In architecture and urbanism, technique does not belong to an individual but to the discipline as a whole. As Foucault has reminded us, techniques are social before they are technical. Hence, to think of architecture as a material practice does not mean leaving questions of meaning entirely behind. Architecture works with cultural and social variables as well as with physical materials, and architecture's capacity to signify is one tool available to the architect working in the city. But material practices do not attempt to control or predetermine meaning. Instead, they go beyond the paradoxes of the linguistic to examine the effects of signifying practices on performance and behavior. Material practices are not about expression—expressing either the point of view of an author or of the collective will of a society; rather they condense, transform, and materialize concepts.[6]



RIGHT: Richard T. T. Foreman, landscape ecology diagrams

BELOW: Carquinez Bridge Approach, Crockett, California, 1958

Architecture is uniquely capable of structuring the city in ways not available to practices such as literature, film, politics, installation art, or advertising. Yet because of its capacity to actualize social and cultural concepts, it can also contribute something that strictly technical disciplines such as engineering cannot. When Walter Benjamin writes that "construction fulfills the role of the unconscious," he articulates the capacity of certain structures to act as a scaffold for a complex series of events not anticipated by the architect—meanings and affects existing outside of the control of a single author that continuously evolve over time.

SEVEN PROPOSITIONS

In retrospect, I really think that we are now dealing with the same issues again, after the "semantic nightmare."

REM KOOLHAAS, 1991

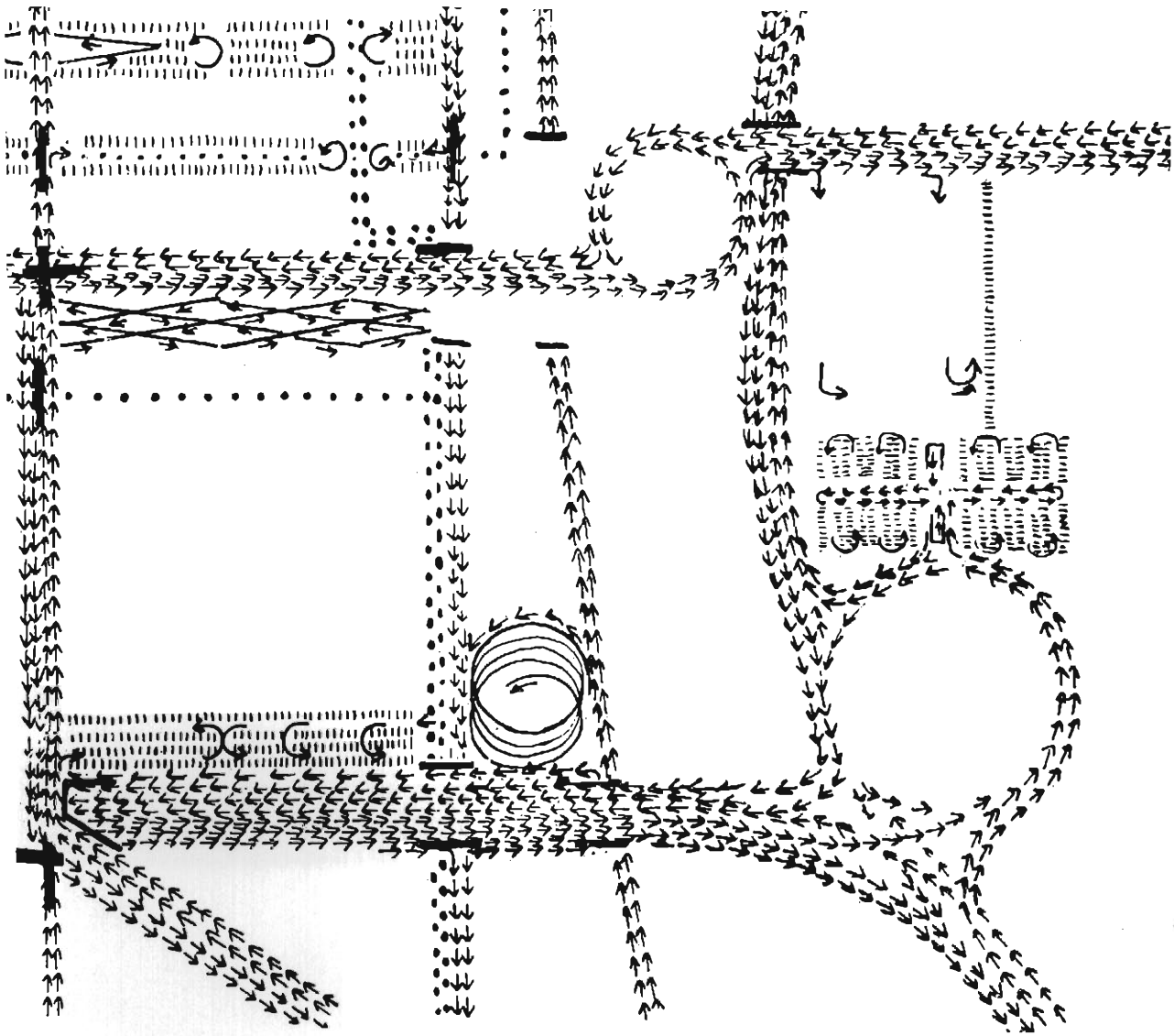
1. Infrastructure works not so much to propose specific buildings on given sites, but to construct the site itself. Infrastructure prepares the ground for future building and creates the conditions for future events. Its primary modes of operation are: the division, allocation, and construction of surfaces; the provision of services to support future programs; and the establishment of networks for movement, communication, and exchange. Infrastructure's medium is geography.

2. Infrastructures are flexible and anticipatory. They work with time and are open to change. By specifying what must be fixed and what is subject to change, they can be precise and indeterminate at the same time. They work through management and cultivation, changing slowly to adjust to shifting conditions. They do not progress toward a predetermined state (as with master planning strategies), but are always evolving within a loose envelope of constraints.

3. Infrastructural work recognizes the collective nature of the city and allows for the participation of multiple authors. Infrastructures give direction to future work in the city not by the establishment of rules or codes (top-down), but by fixing points of service, access, and structure (bottom-up). Infrastructure creates a directed field where different architects and designers can contribute, but it sets technical and instrumental limits to their work. Infrastructure itself works strategically, but it encourages tactical improvisation. Infrastructural work moves away from self referentiality and individual expression toward collective enunciation.

4. Infrastructures accommodate local contingency while maintaining overall continuity. In the design of highways, bridges, canals, or aqueducts, for example, an extensive catalog of strategies exist to accommodate irregularities in the terrain (doglegs, viaducts, cloverleaves, switchbacks, etc.), which are creatively employed to accommodate existing conditions while maintaining functional continuity. Nevertheless, infrastructure's default condition is regularity—in the desert, the highway runs straight. Infrastructures are above all pragmatic. Because it operates instrumentally, infrastructural design is indifferent to formal debates. Invested neither in (ideal) regularity nor in (disjunctive) irregularity, the designer is free to employ whatever works given any particular condition.

5. Although static in and of themselves, infrastructures organize and manage complex systems of flow, movement, and exchange. Not only do they provide a network of pathways, they also work through systems of locks, gates, and valves—a series of checks that control and regulate flow. It is therefore a mistake to think that infrastructures can in a utopian way enable new freedoms, that there is a possibility of a net gain through new networks. What seems crucial is the degree of play designed into the system, slots left unoccupied, space left free for unanticipated development. This also opens the question of the formal description of infrastructural systems: infrastructures tend to be hierarchical and tree-like. However, there are effects of scale (a capillary effect when the elements get very numerous and very small) and effects of synergy (when systems overlap and interchange), both of which tend to produce field conditions that disrupt the overall tendency of infrastructural systems to organize themselves in linear fashion.



Louis Kahn: movement diagrams, Philadelphia Planning Study.

6. Infrastructural systems work like artificial ecologies. They manage the flows of energy and resources on a site, and they direct the density and distribution of a habitat. They create the conditions necessary to respond to incremental adjustments in resource availability, and modify the status of inhabitation in response to changing environmental conditions.

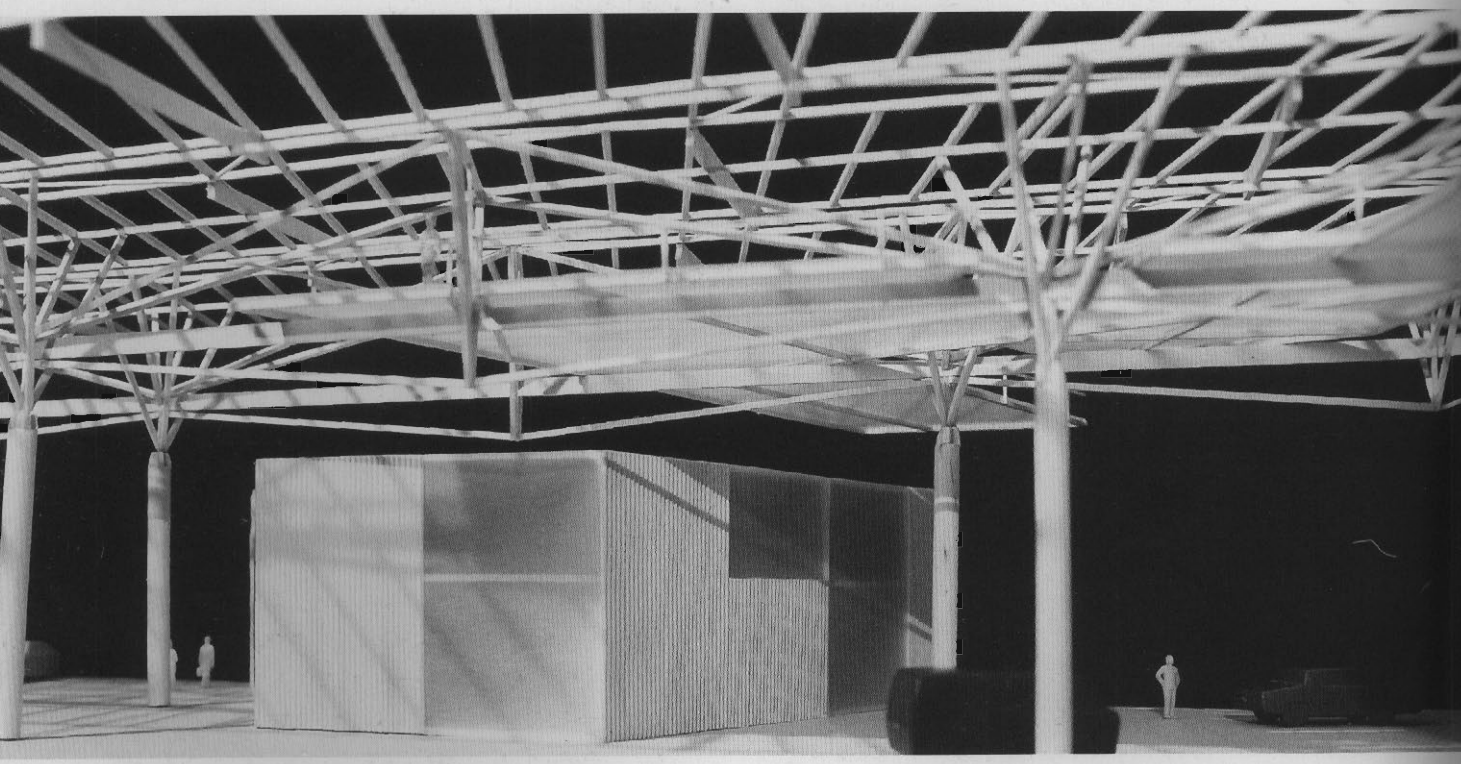
7. Infrastructures allow detailed design of typical elements or repetitive structures, facilitating an architectural approach to urbanism. Instead of moving always down in scale from the general to the specific, infrastructural design begins with the precise delineation of specific architectural elements within specific limits. Unlike other models (planning codes or typological norms for example) that tend to schematize and regulate architectural form and work by prohibition, the limits to architectural design in infrastructural complexes are technical and instrumental. In infrastructural urbanism, form matters, but more for what it can do than for what it looks like.

"The time has come to approach architecture urbanistically and urbanism architecturally"[7]

NOTES:

1. Le Corbusier, *Aircraft* (1935; reprint New York: Universe Books, 1988), illustration 18.
2. Robert Venturi, *Complexity and Contradiction in Architecture* (New York: The Museum of Modern Art, 1966); Colin Rowe and Fred Koetter, *Collage City* (Cambridge, MA: MIT Press, 1978). Note that the text to *Collage City* was completed in 1973 and widely circulated before the publication of the book.
3. "Words like investigation, enquiry and interrogation, used much in describing what designers do, suggest that designing is a way of finding out, as if the process of design were conducted in some kind of mental laboratory in which the boundaries of knowledge were being pushed slowly but surely forward." Robin Evans, "Bad News," paper delivered at th Conference on Theory and Practice in the Work of John Hedjuk, Canadian Centre of Architecture, Montreal, 15 May 1992.
4. Robin Evans, The Projective Cast (Cambridge, MA: MIT Press, 1995), 91–2.
5. Michel Foucault, "Space, Knowledge, and Power," in *The Foucault Reader*, ed. Paul Rabinow (New York: Pantheon Books, 1984), 244.
6. In the terms of the distinction proposed by Gilles Deleuze, material practices are more concerned with the actualization of the virtual than with the realization of the possible. See Gilles Deleuze, *Bergsonism*, trans. Hugh Tomlinson and Barbara Habberjam (New York: Zone Books, 1989), 97. On the subject of virtuality, and on a number of other points, I have referred to Michael Speaks, "Redirecting the Global Space of Flows," paper given at the Berlage Institute, Amsterdam, 28 October 1997.
7. Alison Smithson, ed., *Team 10 Primer* (Cambridge, MA: MIT Press, 1968), 73. While an entire section of the *Primer* is devoted to "Urban Infrastructure," the primary subject is the problem of large-scale motorways. Nevertheless, Team 10's attention to questions of scale, use, movement and flow, and the evolution of the urban landscape over time make their thoughts an exemplary and obligatory starting point in any discussion of architecture and infrastructure.

Logistical Activities Zone, Barcelona



COMPETITION, 1996

ARCHITECT: Stan Allen

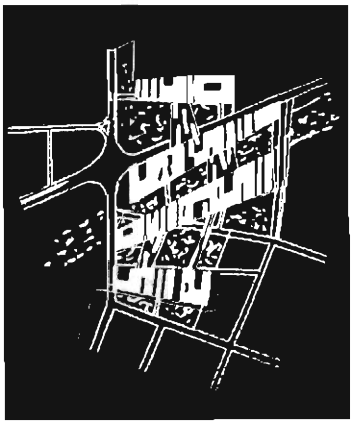
ASSISTED BY: Céline Parmentier, Tsuto Sakamoto, Adriana Nacheva, and Troels Rugbjerg

User's Manual research and layout by Nona Yehia

The municipality of Barcelona intends to divert the LLobregat River and extend its existing port facilities. An open international competition was held in 1996 for the Logistical Activities Zone (ZAL) adjacent to the new port area. We took this competition as an opportunity to examine the potentials of an infrastructural urbanism. Our design strategy consisted of setting down the traces of an architectural infrastructure that would allow flexible development while maintaining unified identity: a directed field within which the future life of the site could unfold; an architectural means to impose minimal although precise limits on future construction.

Refusing the chaos of the suburban landscape without resorting to nostalgic urban patterns, we sought an order specific to the open zones at the edge of the city. Two prototypical strategies were proposed: a division of land that recognizes the presence of nature and maintains open green space; a continuous architectural infrastructure that will allow flexible development while maintaining unified identity.

Although developed initially by means of conventional representational techniques (plans, sections, and models) the elaboration of the project required new representational strategies. The diagrams, maps, scores, and scripts that anticipate the event structure of the site over time have been compiled into a *User's Manual*. In the infrastructural approach, limits to future development are set materially, and not through codes, zoning, or bureaucratic limits. Hence, the role of the notational schemas collected here is not to set limits but to imagine multiple program scenarios and to chart their interaction. These notations do not so much map an exact correspondence between architecture and activity as articulate a degree of play between form and event, a loose fit of organization and program.



LEFT: Sketch of structure

OPPOSITE: Model: infrastructural roof

1. SURFACES

Borrowing a concept from landscape ecology, the given surface area of the site is organized into *patches* and *corridors*. *Patches* are defined as nonlinear surface areas– in this case either green areas where a return to indigenous habitat is encouraged or built-up areas to accommodate the new programs. *Corridors* are infrastructural pathways containing movement, services, and function. The superposition of these two systems creates a mosaic of natural and artificial surfaces.

2. MOVEMENT

Boundary and through roads are connected into the present system of urban circulation. To facilitate connection with the ZAL, the primary circulation is on uninterrupted east-west routes. Secondary circulation is by means of local connecting roads aligned with the disjunctive network of patches. Pedestrian movement is at an upper level within the depths of trusses supporting a continuous roof structure.

3. PROGRAM

Four broad programmatic categories are proposed: *work* (workshops and ateliers for artists and artisans); *display* (showrooms and other exhibition facilities), *service* (vehicle services, hotel and office space); and *recreation* (sports facilities and open green spaces for leisure and events). Individual patches are programmed in relation to access, adjacency, and proximity to services.

4. PATCH TYPOLOGIES

Instead of specific design proposals for future occupation of the site, a series of loose organizational typologies are proposed. Depending on density and organization, patches might function as habitat, barrier, filter, source, or sink for future activity. Scale and density of architectural occupation in turn suggests possible programs.

5. INFRASTRUCTURE

The architectural space of the patches is articulated by a continuous roof structure supported on a regular grid of thin steel columns. This infrastructural element is adaptable and flexible. A lightweight fabric covering can be added to shelter public spaces or outdoor service areas, and where buildings are proposed it can be integrated into the structural system as sunbreak or service space.

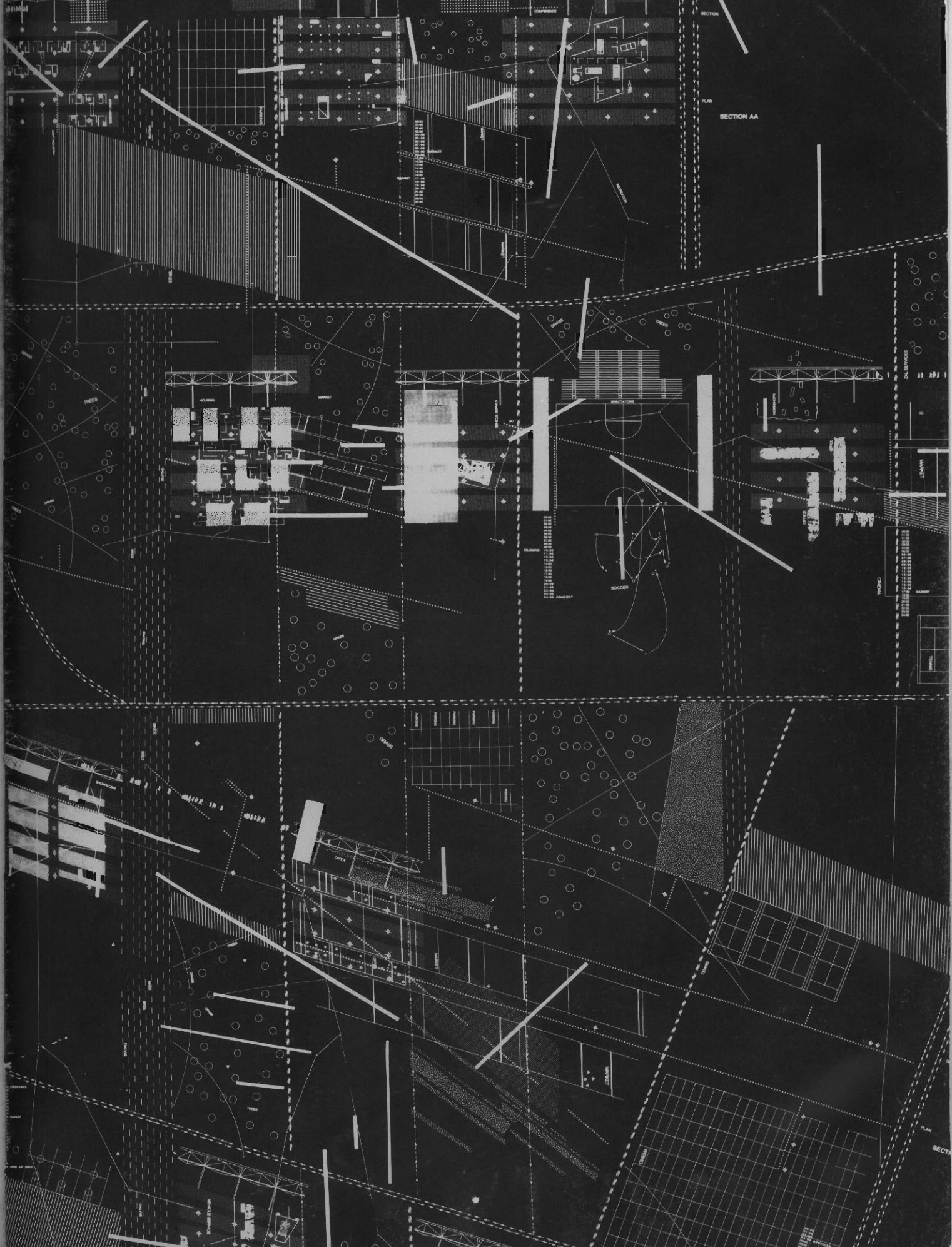
LEFT: View of existing site

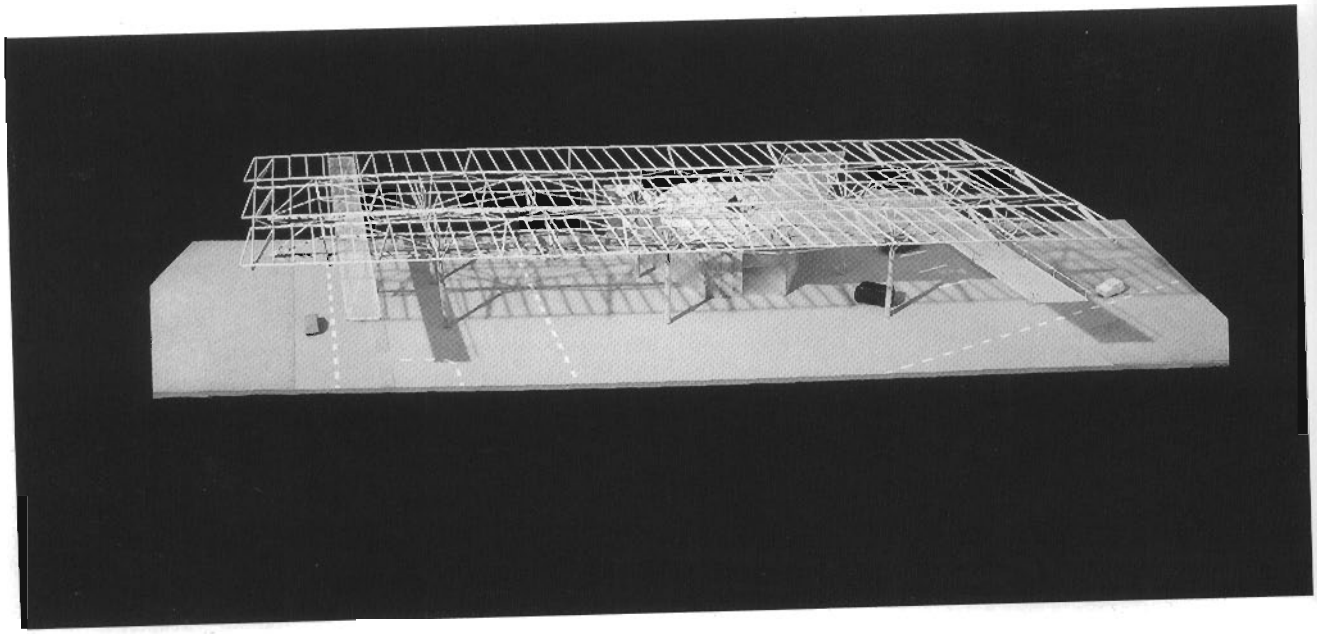
OPPOSITE: Plan: montage of scenarios

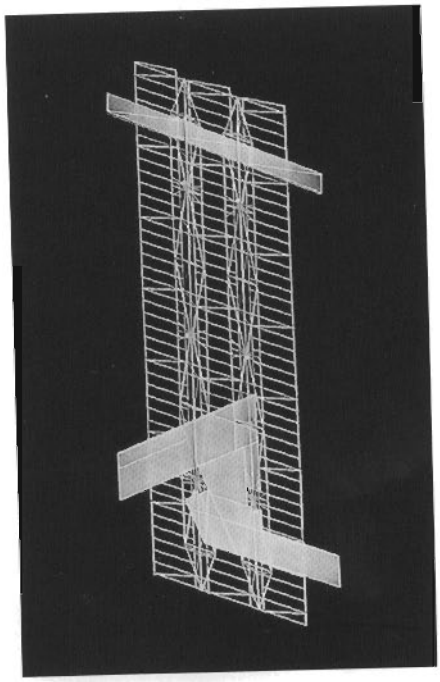
Taking an optimistic view of the future of the site, this project anticipates the participation of different architects, agencies, and individuals in the construction of the site. It seeks to establish a realistic framework within which these collective contributions can be organized and coordinated. Working not with the bureaucratic tools of zoning—regulations or codes—it seeks to establish precise technical and instrumental limits to future construction. By creating a structured field condition that is architecturally specific yet programatically indeterminate, the future life of the site is free to unfold beyond the fixed limits of a masterplan.

NOTES

1. "We may define *patch* as a non-linear surface area differing in appearance from its surroundings.... Patches are often embedded in a *matrix*, a surrounding area that has a different species, structure, or occupation." Richard T. T. Forman and Michael Godron, *Landscape Ecology* (New York: Wiley, 1986), 83.


SECTION AA
SOCCER





ABOVE: **Partial model**

RIGHT: **Roof from below**

OPPOSITE AND FOLLOWING PAGES: *User's Manual*

1 surface
division and allocation of surfaces

1A Patches
1B Matrix
1C Mosaic
1D Extent

2 service
provision of services to support future programs

2A Pathways
2B Program
2C Flow / Movement / Exchange
2D Service Grids

3 organization
spatial and formal models

3A Edges and Boundaries
3B Affiliation
3C Corridors and Connectivity
4D Networks

barcelona manual

4 structure
catalog of tectonic variations

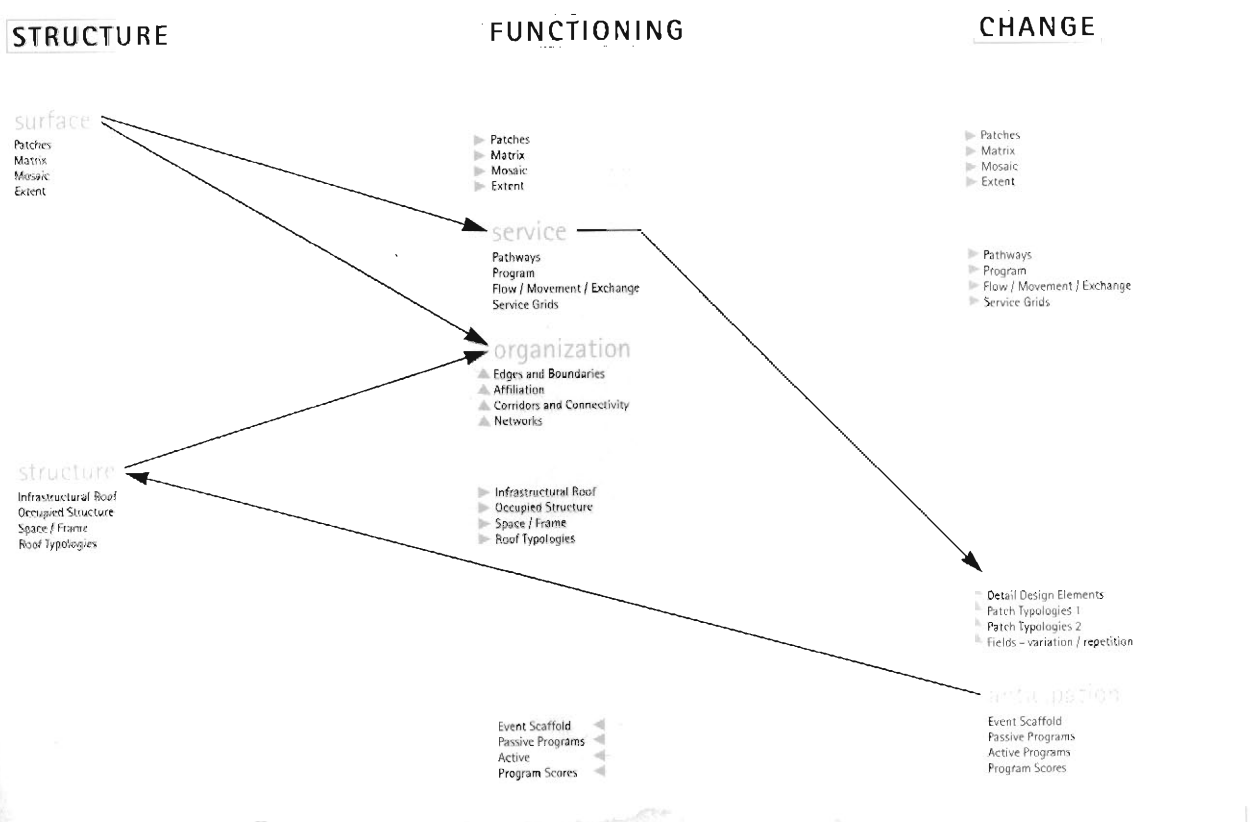
4A Infrastructural Roof
4B Occupied Structure
4C Space / Frame
4D Roof Typologies

5 repetition
typologies and programs

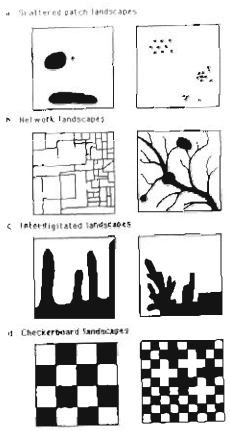
5A Detail Design Elements
5B Patch Typologies 1
5C Patch Typologies 2
5D Fields – variation / repetition

6 anticipation
changing life of these structures

6A Event Scaffold
6B Passive Programs
6C Active
6D Program Scores

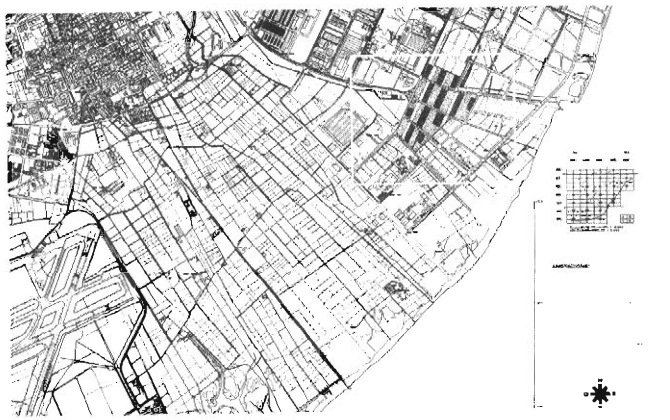


1A
SURFACE
PATCHES

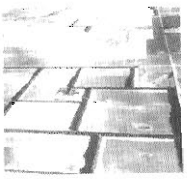


RICHARD T.T. FORMAN
PATCH TYPOLOGIES

a nonlinear surface area differing in appearance from its surroundings
the density of patches, or the fineness of a mosaic
an area that has been disturbed within a matrix
the rate of appearance and disappearance of patches
an area caused by an animal social behavior or by low-intensity, short lived fluctuations in environmental factors within a matrix



LOCATION PLAN

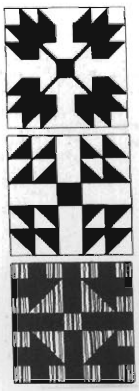


1. Infrastructure works not so much to propose specific buildings on given sites, but to construct the site itself. Infrastructure prepares the ground for future building, and creates the conditions for future events. Its primary modes of operation are:

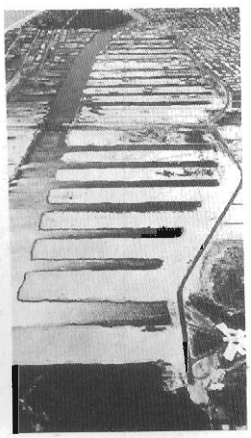
1. The division, allocation and construction of surfaces
2. The provision of services to support future programs
3. The establishment of networks for movement, communication and exchange

Infrastructure's medium is geography.

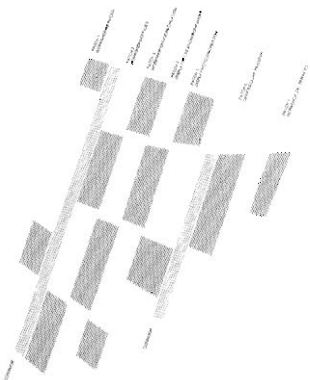
1B
SURFACE
MATRIX



QUILTING PATTERNS

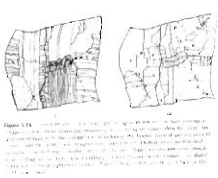


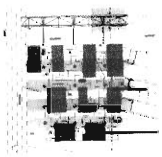
GREEN MATRIX



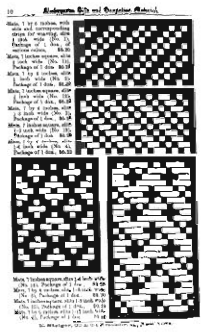
PATCHES + CORRIDORS

an area that becomes free of disturbance within a chronically disturbed matrix
the rate of appearance and disappearance of patches
a table of replacement rates over a time period for all landscape elements present
a landscape with a densely built-up matrix

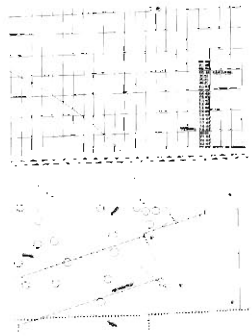




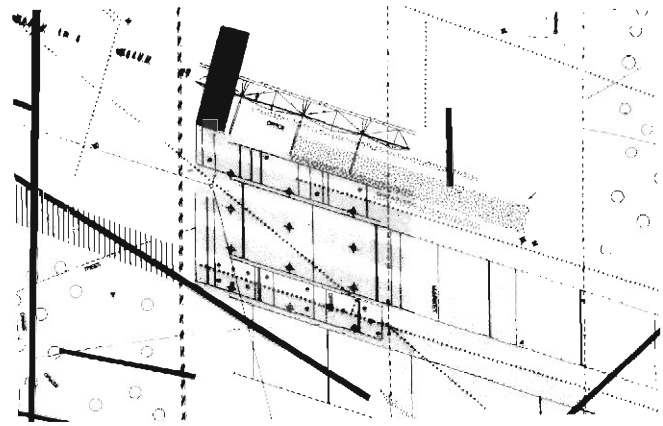
1C
SURFACE
MOSAIC



FROEBEL PATTERNS



PLAN DETAILS / PROGRAM SCENARIOS
EVENT FIELD



PLAN DETAILS / PROGRAM SCENARIOS
OFFICE PATCH / GREEN SPACE

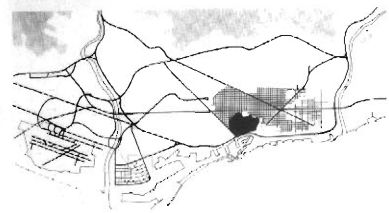
a tract of patches of different aged trees.
a system exhibiting a pattern of long-term change along with short- term internal spatial conversions.
a state of being in equilibrium (oscillating around a central position) but susceptible to being diverted to another equilibrium.
methods that conveniently analyze many factors, plus the relationship among factors.

HILBERSEIMER
SITE PLAN OF HYDE PARK

1D
SURFACE
EXTENT

OVERVIEW OF SITE

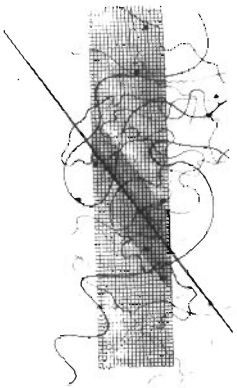
a pattern where species distributions are related to the width of a landscape element.
the establishment, and usually defense, of a certain small area ("territory") against intrusions by other individuals of the same species.
a map that accurately represents a spatial ordering, but is not proportional to the distance and the length of time necessary to cover a route. Also, a geometry dealing with the continuous connectedness between points of a figure.



URBAN CONTEXT DIAGRAM

2A SERVICE

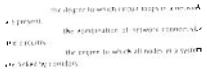
PATHWAYS

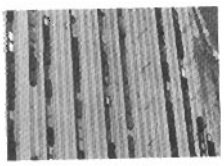


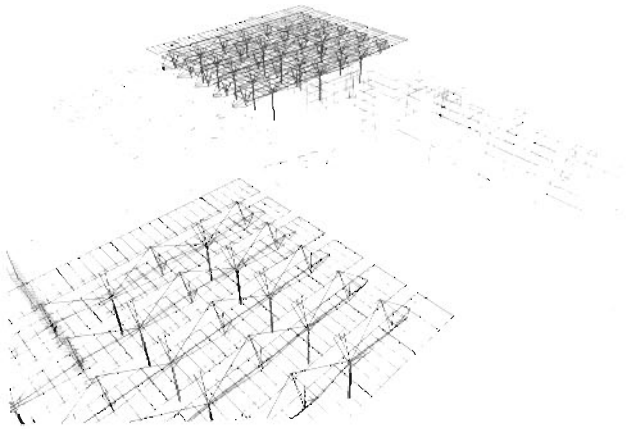
JOHN CAGE'S SCORE FOR FONTANA MIX

NOTATIONS:

Traditional representations presume stable objects and fixed subjects. But the contemporary city is not reducible to an artifact. The city is a place where visible and invisible streams of information, capital and subjects, interact in complex formations. They form a dispersed field, a network of flows. In order to describe or to intervene in this new field we need representational techniques that engage time and change, shifting scales, mobile points of view and multiple programs. In order to map its complexity, some measure of control may have to be relinquished. To open architectural representation to the score, the map, the diagram and the script could establish a basis for exchange with other disciplines such as film, music and performance. The score allows for the simultaneous presentation and interplay of information in diverse scales, or shifting coordinates and even of differing linguistic codes. The script allows the designer to engage program, event and time on specifically architectural terms. New maps and diagrams might begin to suggest new ways of working with the complex dynamics of the contemporary city.







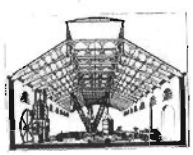
AERIAL VIEW

2. Infrastructural work recognizes the collective nature of the city, and allows for the participation of multiple authors. Infrastructures give direction to future work in the city not by the establishment of rules or codes (top-down), but by fixing points of service, access and structure (bottom-up). Infrastructure creates a directional field, where different architects and designers can contribute, but it sets technical and instrumental limits to their work. Infrastructure itself works strategically, but it encourages tactical improvisation.

2B SERVICE

PROGRAM

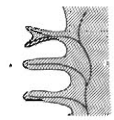
MARKET SERVICES



ERECTING SHOP

PROGRAM PATCHES

2C
SERVICE
FLOW / MOVEMENT / EXCHANGE



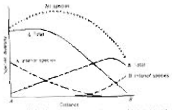
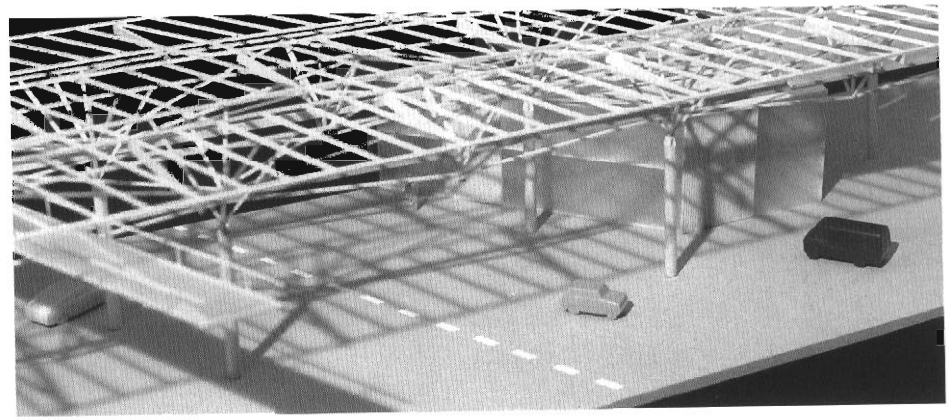


Figure 13.6 Peninsular interdigitation and the expected species diversity patterns. A and B are two communities separated along horizontal transects. The graph indicates the expected average species diversity (number of species found on the sampling stops, horizontal lines across the area in this example is arbitrarily) in a higher diversity than B



MODEL DETAIL

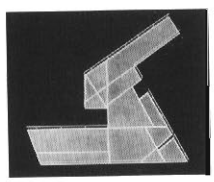
RAILWAY INTERCHANGE

KAHN FLOW DIAGRAM

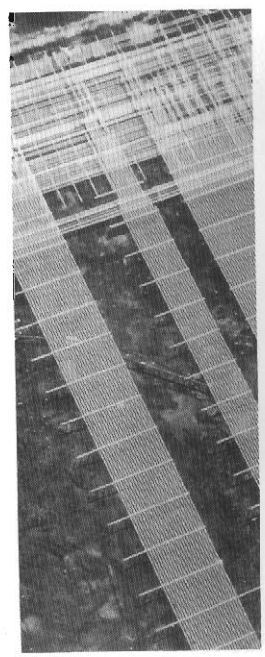
2. Although static in and of themselves, infrastructures organize and manage complex systems of flow, movement and exchange. Not only do they provide a network of pathways, thye also work through systems of locks, gates and valves - a series of checks that control and regulate flow.

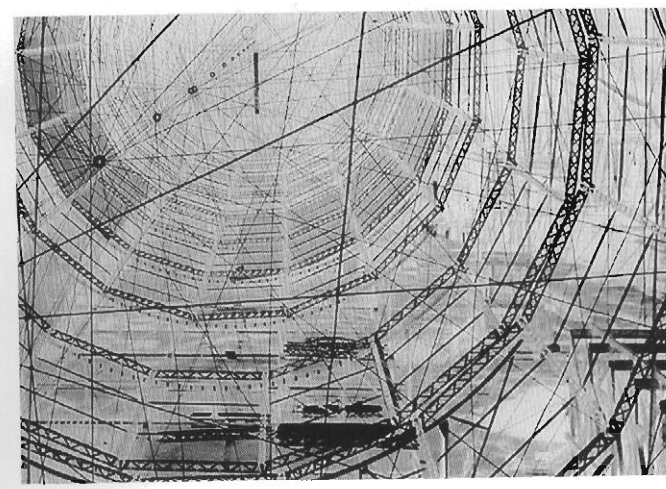
2D
SERVICE
SERVICE GRIDS

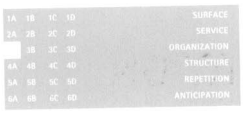
a process by which objects leave one area and spread to another area;
a process by which objects extend their area of overlap while continuing to occupy the original position.
an event or characteristic that has a direct or relatively direct effect on an organism.



PEDESTRIAN WALKWAY

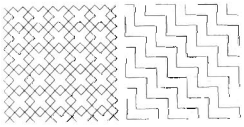




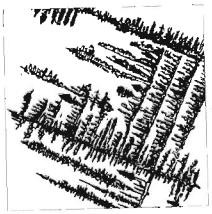


3A ORGANIZATION

EDGES + BOUNDARIES



QUILTING PATTERNS



5. Crystal pattern; from Johann Kilian, *Der Kristall* (Berlin: P. Zsolnay, 1937), p. 142, Ill. 33. Photo courtesy of Ludwig Mies van der Rohe

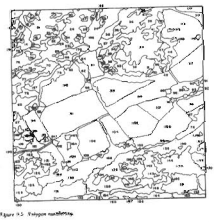
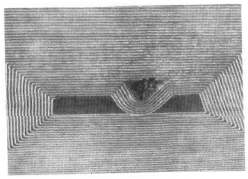
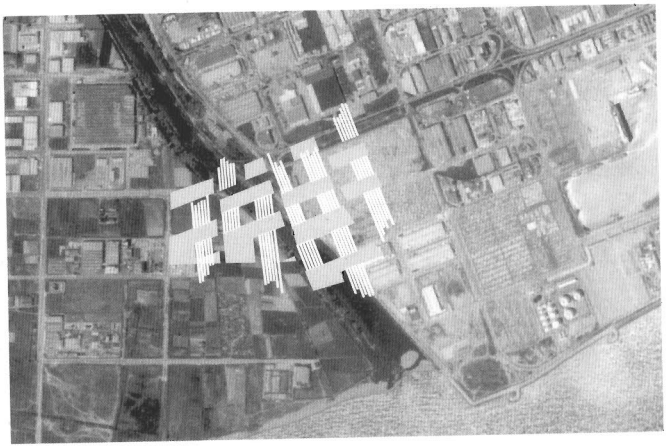


Figure 4-3 Polygon numbering





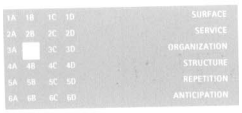
AERIAL PHOTOGRAPH OF SITE

a distinctive species composition or relative abundance in the outer band of a patch (i.e., different from the species composition or relative abundance of the patch interior).

the degree of abruptness between landscape elements.

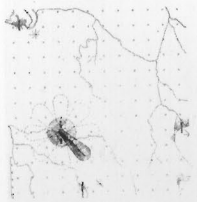
the effect of the edge on flows, analogous to a semipermeable membrane.

3. **Infrastructures** accomodate local contigency while maintaining overall continuity. In the design of highways, bridges, canals or aqueducts, for example, an extensive catalogue of strategies exist to accomodate irregularities in the terrain (doglegs, viaducts, cloverleaves, switchbacks, etc.) which are creatively employed to accomodate existing conditions while maintaining functional continuity. Infrasructure's default condition is regularity - in the desert, the highway runs straight. Infrastructures are above all pragmatic. Because it operates instrumentally, infrastructural design is indifferent to formal debates. Invested neither in (ideal) regularity or in (disjunctive) irregularity, the designer is free to employ whatever works in the particular conditions.



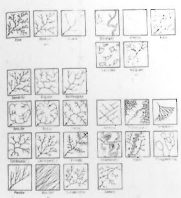
3B ORGANIZATION

AFFILIATION



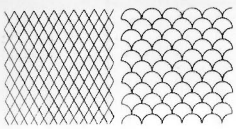
DECENTRALIZATION DIAGRAM

PERFORMANCE:
This project marks a shift away from issues of representation to engage architecture as a MATERIAL PRACTICE. Material practices, (ecology, or engineering for example) do not work primarily with images or meaning but with PERFORMANCE: energy inputs and outputs, the calibration of force and resistance. They are less concerned with what things look like and more concerned with what they can do. Material practices do not attempt to control or predetermine meaning. Instead, they go beyond the paradoxes of the linguistic to examine the effects of signifying practices on performance and behavior. Although these material practices work instrumentally, they are not limited to the direct manipulation of given material. Instead they project transformations of reality by means of abstract techniques such as notation, simulation or calculation.

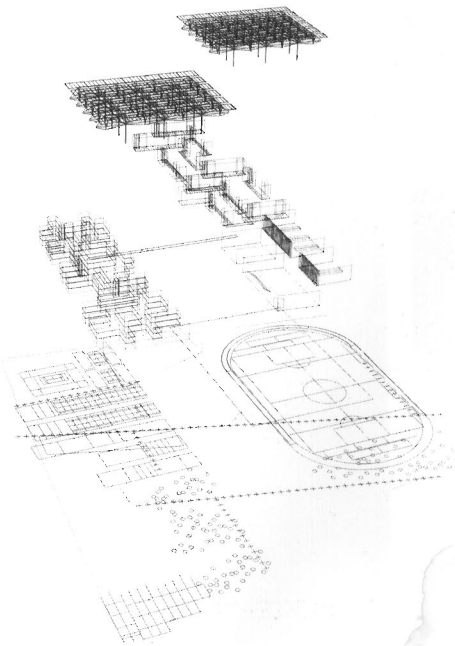


DRAINAGE DENSITIES

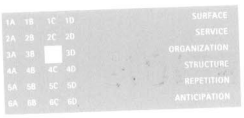
laminar air flows layers or streams of air moving in parallel fashion, one on top of another.
connectivity points a location where three or more types of landscape elements intersect.
connectivity line a line corridor seperating two types of landscape elements, thus providing three types in close proximity.



QUILTING PATTERNS

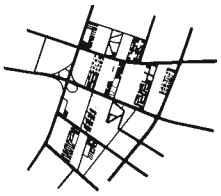


PARTIAL SITE AXONOMETRIC

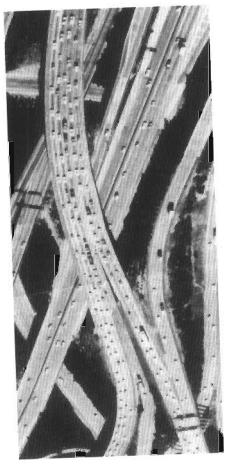


3C ORGANIZATION

CORRIDORS + CONNECTIVITY



PAVED SURFACES



MOVEMENT NOTATION

a wide band with a central interior environment that contains an abundance of interior species.

ecological conditions being modified significantly by the presence of an interconnection of corridors.

a narrow band essentially dominated throughout by edge species.

a narrow strip of land that differs from the matrix on either side.

selective absorption or blocking that prevents objects from crossing a corridor.

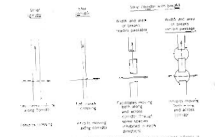
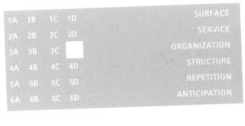


Figure 11.2 How I-5 corridor width and breaks (at movement across a landscape). The shaded areas indicate conditions (A) to movement and emphasize the critical importance of break areas (from Forman, 1983. Courtesy of Ecology, CSIR.)

STITCH MAP

3D ORGANIZATION

NETWORK



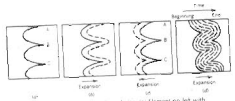


Figure 5.9 Concave and convex boundaries. (a) Element on left with concave boundaries, element on right with convex boundaries. (b) Dashed line indicates the new frontier as element on left spreads. (c) Dashed line indicates the new frontier as element on right spreads. (d) Over time, the concave margin of the spreading element on left becomes convex.

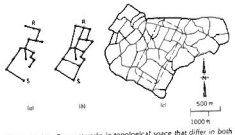
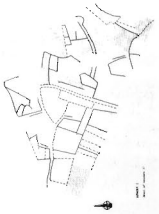


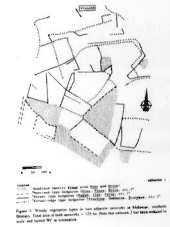
Figure 11.12 Two networks in topological space that differ in both connectivity and circuitry. Simple indices are given in the text for evaluating the amount of both variables that together are a measure of network complexity. Network b represents the dotted area of map c, indicating hedgerows of a medieval field pattern in Devon, England. This farm of late Saxon origin is shown in the Domesday Book of 1086, probably as pastureland. The characteristic small and irregular fields were created in the following century (adapted from Hoskins, 1955).

network complexity: the degree to which circuit loops in a network are present.

network complexity: the combination of network connectivity and circuitry.

network connectivity: the degree to which all nodes in a system are linked by corridors.





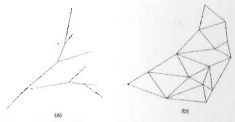
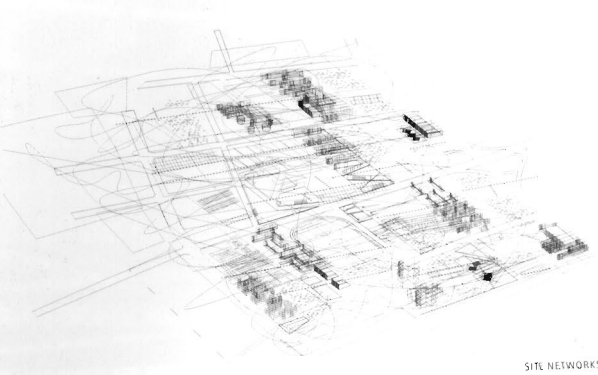


Figure 4.2 TWO NETWORK CATEGORIES: 'BRANCHING NETWORKS' (A) WITHOUT CLOSED LOOPS AND 'CIRCUIT NETWORKS' (B) WITH CLOSED LOOPS



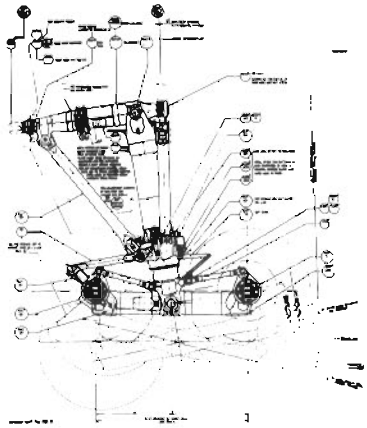
SITE NETWORKS

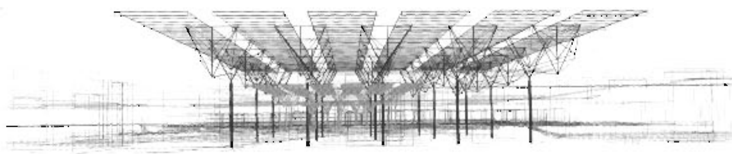
4. Formal description of **infrastructural systems:** infrastructures tend to be hierarchical and tree-like, however there are effects of scale - a capillary effect when the elements get very numerous and very small - and the effects of synergy, when systems overlap and interchange, both of which tend to produce field conditions that work against an exclusively vectorial organization of infrastructural systems.

1A	1B	1C	1D	SURFACE
2A	2B	2C	2D	SERVICE
3A	3B	3C	3D	ORGANIZATION
	4B	4C	4D	STRUCTURE
5A	5B	5C	5D	REPETITION
6A	6B	6C	6D	ANTICIPATION

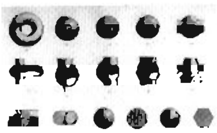
4A STRUCTURE

INFRASTRUCTURAL ROOF





a structure composed of linear features that interconnect and form circuits or loops.
a threshold above which a force destroys a system.
the intensities, frequencies, and ... of perturbations (disturbances) characterizing each ecosystem type in a cluster of ecosystem types.

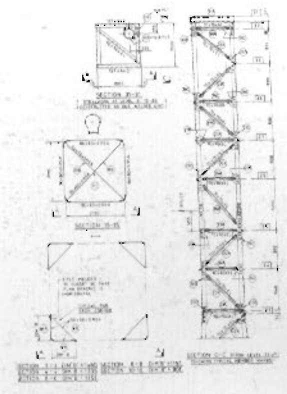


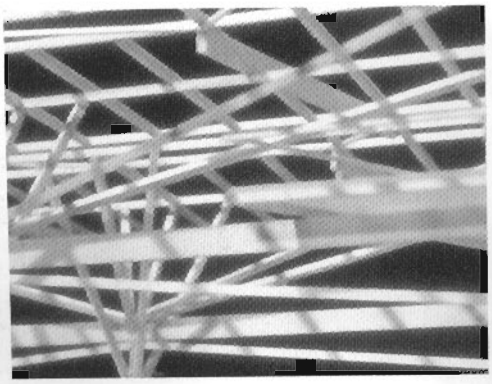
4. **Infrastructural** systems work like artificial ecologies. They manage the flows of energy and resources on a site, and direct the density and distribution of habitat. They create the conditions necessary to respond to incremental adjustments in resource availability, and modify status of inhabitation in response to changing environmental conditions.

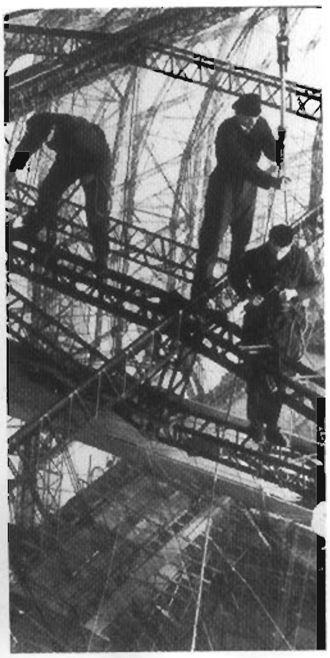
1A	1B	1C	1D	SURFACE
2A	2B	2C	2D	SERVICE
3A	3B	3C	3D	ORGANIZATION
4A		4C	4D	STRUCTURE
5A	5B	5C	5D	REPETITION
6A	6B	6C	6D	ANTICIPATION

4B STRUCTURE

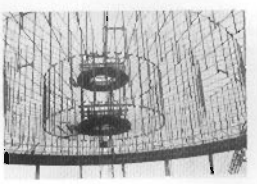
OCCUPIED STRUCTURE

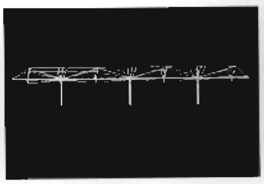




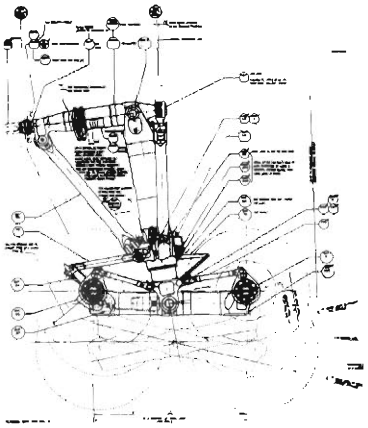


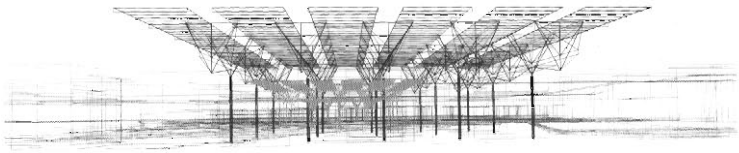
gradually increasing in biomass or structure.
the amounts of organic matter, acidity, and roots present that affect the aggregation of soil particles.
the study of the behavior of, and interactions among components in, a model of a complex system.
an operation in which the parts or elements of an object are transformed into new forms when combined.



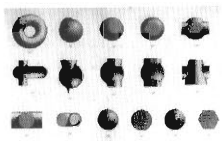


4A
STRUCTURE
INFRASTRUCTURAL ROOF



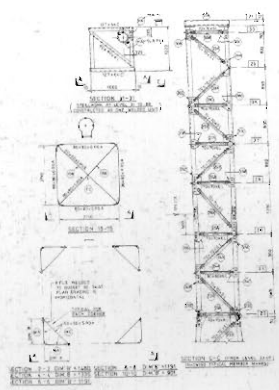


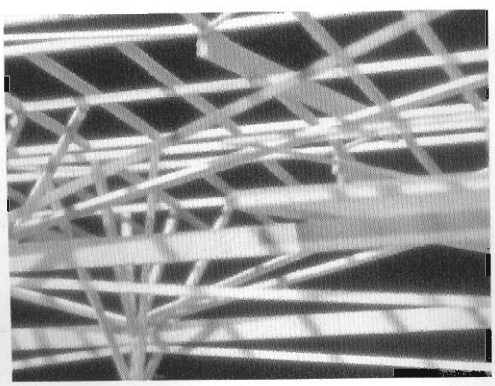
a structure composed of linear features that interconnect and form circuits or loops.
a threshold above which a force destroys a system.
the intensities, frequencies, and types of perturbations (disturbances) characterizing each ecosystem type in a cluster of ecosystem types.

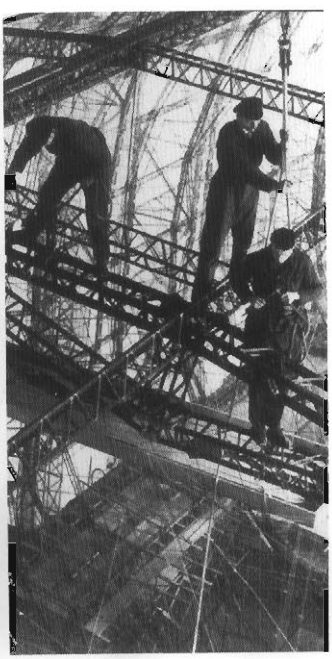


4. Infrastructural systems work like artificial ecologies. They manage the flows of energy and resources on a site, and direct the density and distribution of habitat. They create the conditions necessary to respond to incremental adjustments in resource availability, and modify status of inhabitation in response to changing environmental conditions.

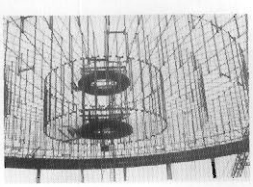
4B
STRUCTURE
OCCUPIED STRUCTURE

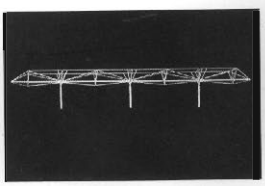






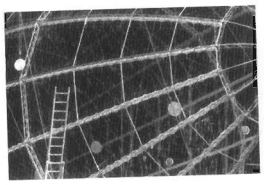
gradually increasing in biomass or structure.
the amounts of organic matter, acidity, and roots present that affect the aggregation of soil particles.
the study of the behavior of, and intersections among components in, a model of a complex system.
an operation in which the parts or elements of an object are transformed into new forms when combined.

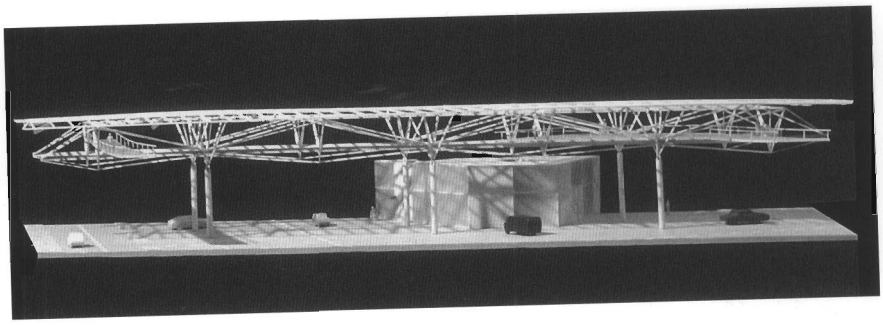


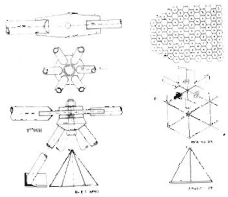


1A	1B	1C	1D	SURFACE
2A	2B	2C	2D	SERVICE
3A	3B	3C	3D	ORGANIZATION
4A	4B		4D	STRUCTURE
5A	5B	5C	5D	REPETITION
6A	6B	6C	6D	ANTICIPATION

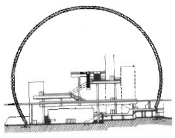
4C
STRUCTURE
SPACE / FRAME



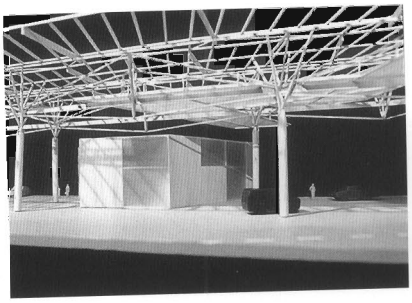


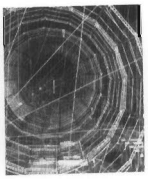


a patch attached to a corridor, both of the same landscape element type.
an intersection of corridors, and a source or sink of flows of objects.



FULLER WORLD EXPOSITION





1A	1B	1C	1D	SURFACE
2A	2B	2C	2D	SERVICE
3A	3B	3C	3D	ORGANIZATION
4A	4B	4C		STRUCTURE
5A	5B	5C	5D	REPETITION
6A	6B	6C	6D	ANTICIPATION

4D
STRUCTURE
ROOF TYPOLOGIES

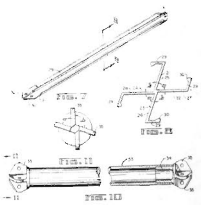
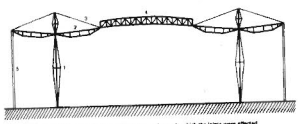
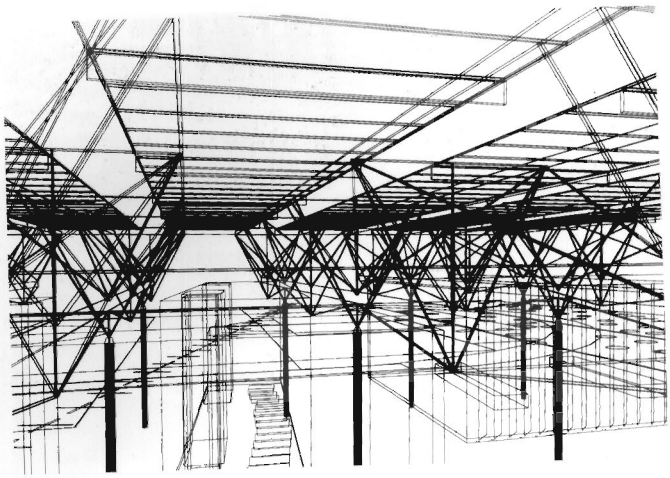
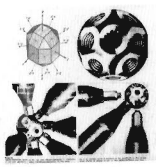


Plate 74.
I. Model of the dock. Fig. 4. A perspective view of a representative truss section of the roof and wall framework. Fig. 5. One of the octahedrons and conjoined tetrahedrons of the truss. Fig. 6. Separate views of the octahedron and tetrahedron units. Fig. 7. A perspective view of one of the struts in Fig. 4. Fig. 8. A cross-section of the strut in Fig. 7. Fig. 10. A side view of a modified strut. Fig. 11. An end view of the strut in Fig. 10.



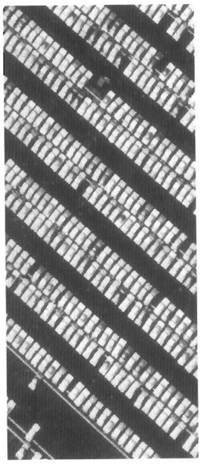
This construction is interesting from the supple way in which the spans were effected. Supports, roof trusses, skylights, and the steel supports for anchoring the cables. The skylights were incorporated constructionally into the metal trusses. The facade of aluminium and glass was hung vertiginous on the overhanging trusses.





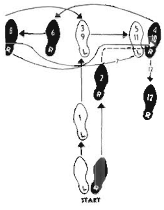
a threshold of force below which a system returns to its original state and above which it is somewhat deformed.
a sequence of sets composed of smaller subsets.
methods that concurrently analyze many factors, plus the relationships among the factors.
a measure of stability, referring to the time period during which a certain characteristic continues to be present at a given level.

5A
REPETITION
DETAIL DESIGN ELEMENTS

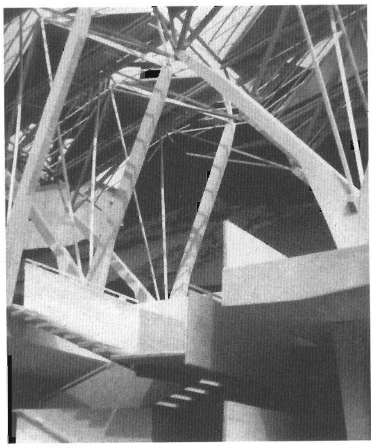


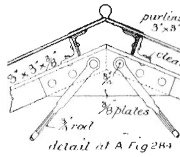
a study beginning with the individual attributes and building up to the broadest groupings of them.
a study of types, or a pre-classification

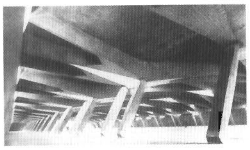
TIME:
Notations include time as a variable. It is not an accident that notations figure most significantly in that arts that unfold in time:music, dance, theater. If we allow, along with Paul Virilio, that the life of the city and its experience belongs more today to time than to space ("Now speed--ubiquity, instantaneousness -- dissolves the city, or rather displaces it, in time"), the special capacity of notation to make the thematic the measurement and unfolding of time takes on a special importance: interval, duration, tempo, acceleration, repetition and accumulation are key variables in the notational schema.



Dance Diagram, 1962
Synthetic polymer paint on canvas, 71 1/4 x 52 in. (181 x 132.1 cm)
Founding Collection, Contribution
The Andy Warhol Foundation for the Visual Arts, Inc



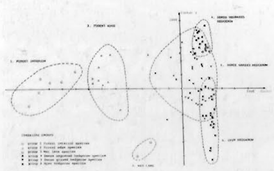


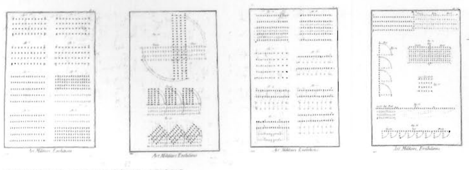


5. Infrastructures allow detailed design of typical elements or repetitive structures, facilitating an architectural approach to urbanism. Instead of moving always down in scale from the general to the specific, infrastructural design begins with the precise delineation of specific systems within specific limits. Unlike other models, (planning codes or typological norms for example), that tend to schematize and regulate architectural form, and work by prohibition, the limits to architectural design in infrastructural complexes are technical and instrumental. In infrastructural urbanism, form matters, but more for what it can do than for what it looks like.

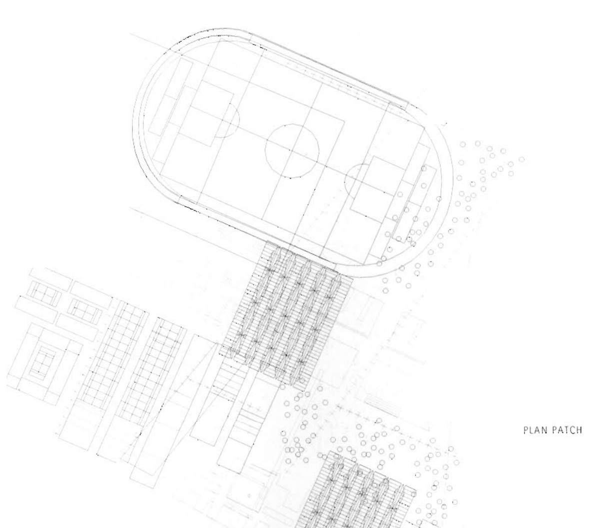
5B
REPETITION
PATCH TYPOLOGIES 1

1. The variables in organizational diagrams include formal and progrqammatic configurations: space and event, force and resistance, density, distribution and direction. Organization always implies both program and its distribution in space, bypassing conventional dichotomies of function vs, form or form vs. content. A diagram is not a thing in itself, but rather a description of potential relationships among elements.





DIDEROT: MILITARY FORMULATIONS

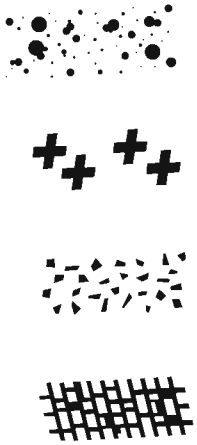


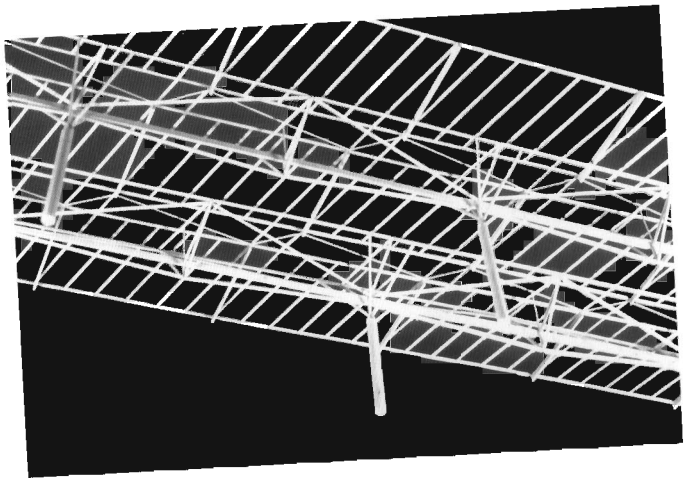
PLAN PATCH

5C
REPETITION

PATCH TYPOLOGIES 2

2. Unlike classical theories based on imitation, diagrams do not map or represent already existing objects or systems but anticipate new organizations and specify yet to be realized relationships. They are not simply a reduction from an existing order; their abstraction is instrumental, not an end in itself. Simplified and highly graphic, they can be loosely interpreted. They work as "abstract machines" and do not resemble what they produce.

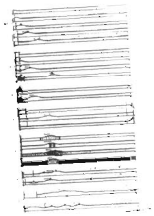


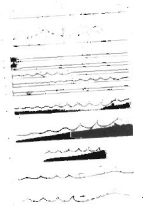


the integration of structure and function, i.e., the spatial configuration and the patterns of flows in a landscape.

a regime, subject to minor environmental changes, that fluctuates but remains in equilibrium.

the distribution of energy, materials, and species in relation to the sizes, shapes, numbers, kinds and configurations of landscape elements or ecosystems.





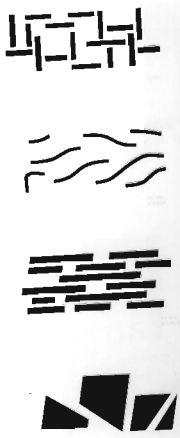
WAVE FORMATIONS

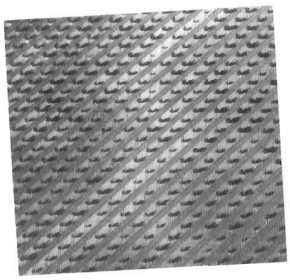
5D
REPETITION

FIELDS—VARIATION / REPETITION

3. Diagrams are not "decoded" according to universal conventions; rather, the relationships are transposed - moved part by part into a new organizational context: "Whereas translation excludes all particulars in favor of a general equivalent, the transposition of media is accomplished serially, at discrete points. [...] Because the number of elements and the rules of association are hardly ever identical, every transposition is to a degree arbitrary, a manipulation. It can appeal to nothing universal and must therefore leave gaps."

—FRIEDRICH A. KITTLER

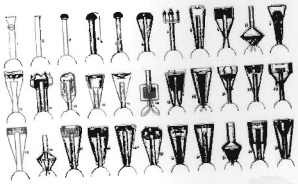




the pattern of spatial arrangement of individuals, such as regular, random, or clustered.

a significantly nonrandom spatial pattern

the degree to which one or a few species predominate in a community in terms of numbers, biomass, or dynamics.



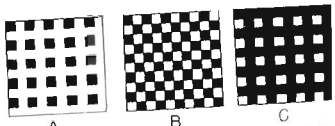


Figure 8. Progression of clear-cutting in a grid pattern using the dispersed-patch model, in which areas are selected for cutting so as to be regularly distributed through the landscape. Shading indicates the (A) 25 percent, (B) 50 percent, and (C) 75 percent cutover points.

1A	1B	1C	1D	SURFACE
2A	2B	2C	2D	SERVICE
3A	3B	3C	3D	ORGANIZATION
4A	4B	4C	4D	STRUCTURE
5A	5B	5C	5D	REPETITION
	6B	6C	6D	ANTICIPATION

6A
ANTICIPATION
EVLNT SCAFFOLD

the maximum number of individuals or maximum biomass that a particular environment can support

a threshold at which the continuity in structure and function of a system is easily altered or broken

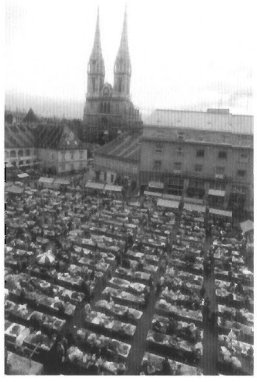
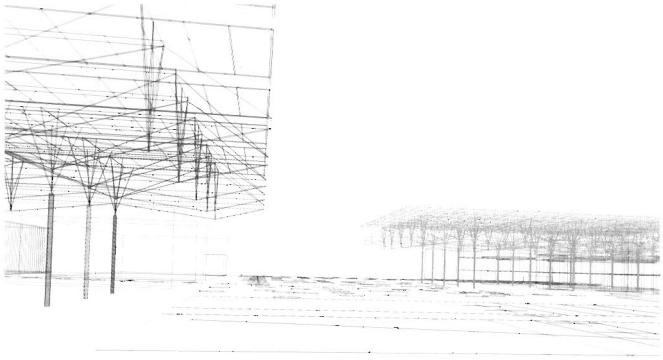


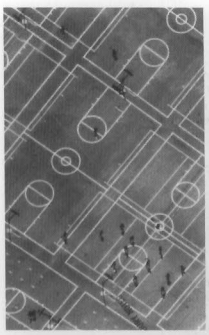
Figure 18.6. Movement of a striped skunk during a single winter night, as determined from tracks in snow. Solid lines are hedgerows; single dashed lines indicate borders of crops within a field; double solid lines indicate a road; and double dashed lines indicate a narrow dirt road. (From R. J. Verts, The Biology of the Striped Skunk, Copyright 1967 by the Board of Trustees of the University of Illinois.)



6. Infrastructures are flexible and anticipatory. They work with time and are open to change. By specifying what must be fixed and what is subject to change, they can be precise and indeterminate at the same time. they work through management and cultivation, changing slowly to adjust to shifting conditions. They do not progress toward a predetermined state (as with master planning strategies), but are always evolving within a loose envelope of constraints.

1A	1B	1C	1D	SURFACE
2A	2B	2C	2D	SERVICE
3A	3B	3C	3D	ORGANIZATION
4A	4B	4C	4D	STRUCTURE
5A	5B	5C	5D	REPETITION
6A		6C	6D	ANTICIPATION

6B
ANTICIPATION
PASSIVE PROGRAMS



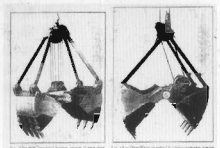
ANTICIPATION:
Notations describe a work that is yet to be realized. Even if already performed, the work described is open to interpretation and change in the course of future performance. In this sense, notation is optimistic and anticipatory. Unlike classical theories of mimeses, notations do not map or represent already exisitng objects or systems but anticipate new organizations and specify yet to be realized relationships. Notation is not about interrogation, critique or commentary. These "critical" practices utilize notation's discursive capacities only in retrospect, (pointing out what is wrong with existing reality) whereas notation's more radical possibility lies in the possibility of proposing alternative realities. Notation's special properties can be expoited by the urban designer' to produce a kind of "directed indeterminancy:" proposals that are robust and specific enough to sustain change over time, yet open enough to support multiple interpretations.

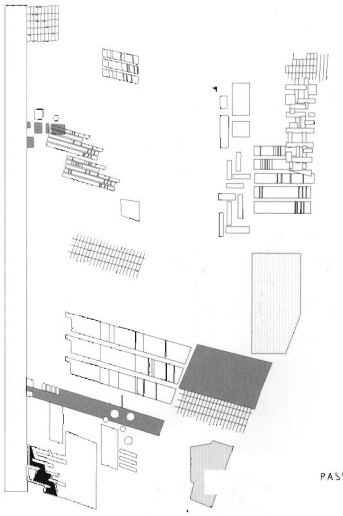
a directional species replacement process, often leading though a series of recognizable stages to a climax community.

the smallest homogenous unit visible at the spatial scale of landscape.

an event or characteristic, e.g., in evolution or geologic history, that causes or controls a proximate factor.

a spot that is colonized by a species, that is, when the species arrives and successfully reproduces and grows.





PASSIVE PROGRAMS

6C
ANTICIPATION
ACTIVE

PERFORMANCE:

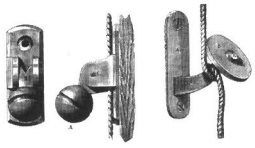
This project marks a shift away from issues of representation, to engage architecture as a material practice. Material practices, (ecology, or engineering for example) do not work primarily with images or meaning but with performance: energy inputs and outputs, the calibration of force and resistance. They are less concerned with what things look like and more concerned with what they can do. Material practices do not attempt to control or predetermine meaning. Instead, they go beyond the paradoxes of the linguistic to examine the effects of signifying practices on performance and behavior. Although these material practices work instrumentally, they are not limited to the direct manipulation of given material. Instead they project transformations of reality by means of abstract techniques such as notation, simulation or calculation.

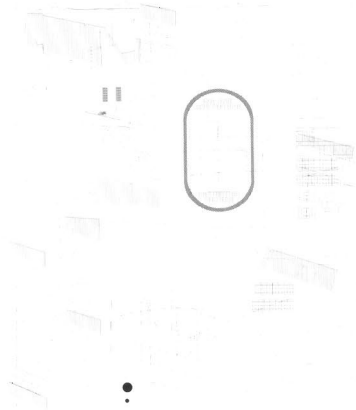
a measure of stability, referring to the time period during which a certain characteristic continues to be present at a given level.

the condition in which a landscape subjected to severe disturbance does not return fully to its previous equilibrium level.

survival of species with irregular fluctuations because of disturbance or unpredictable (stochastic) events.

a process of increasing effeciency or planning for increased effeciency, usually are among several characteristics.

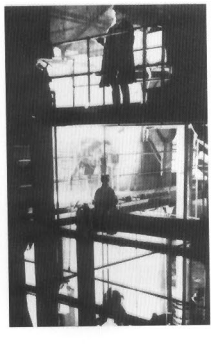




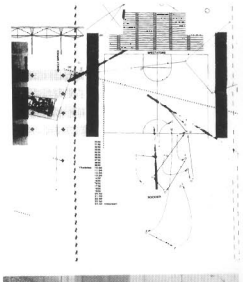
ACTIVE PROGRAMS

1A 1B 1C 1D SURFACE
2A 2B 2C 2D SERVICE
3A 3B 3C 3D ORGANIZATION
4A 4B 4C 4D STRUCTURE
5A 5B 5C 5D REPETITION
6A 6B 6C ANTICIPATION

6D
ANTICIPATION
PROGRAM SCORES



COLLECTIVE:
Notations presume a social context, and shared conventions of interpretation. The score is not a work itself, but a set of instructions for performing a work. A score cannot be a private language. It works instrumentally to coordinate the actions of multiple performers who collectively produce the work as event. As a model for operating in the city, the collective character of notation is highly suggestive. Going beyond transgression and cross-programming, notations could function to map the complex and indeterminate theater of everyday life in the city. The use of notation might provoke a shift from the production of space to the performance of space.

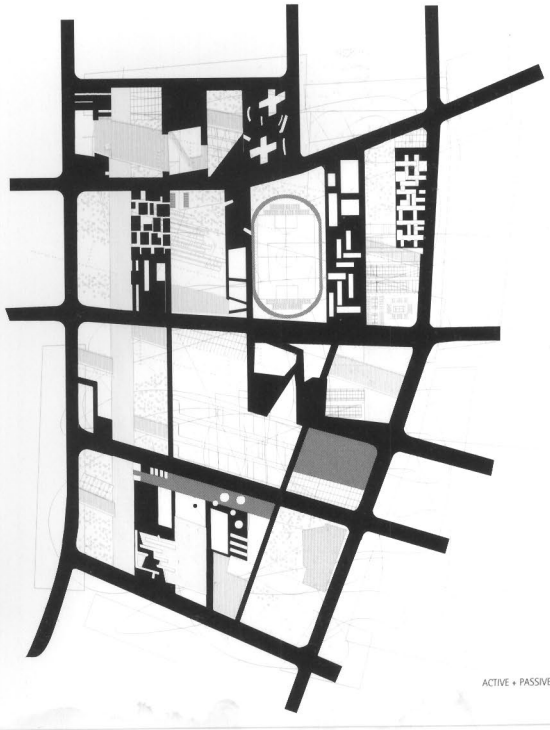


a process of forming a number of cities surrounded by suburbia.

the particular species present, for example in a community.

changes in a community due to colonization, extinction, and population size fluctuation.

an area (usually large) fromwhich species come in colonization.



ACTIVE + PASSIVE PROGRAMS

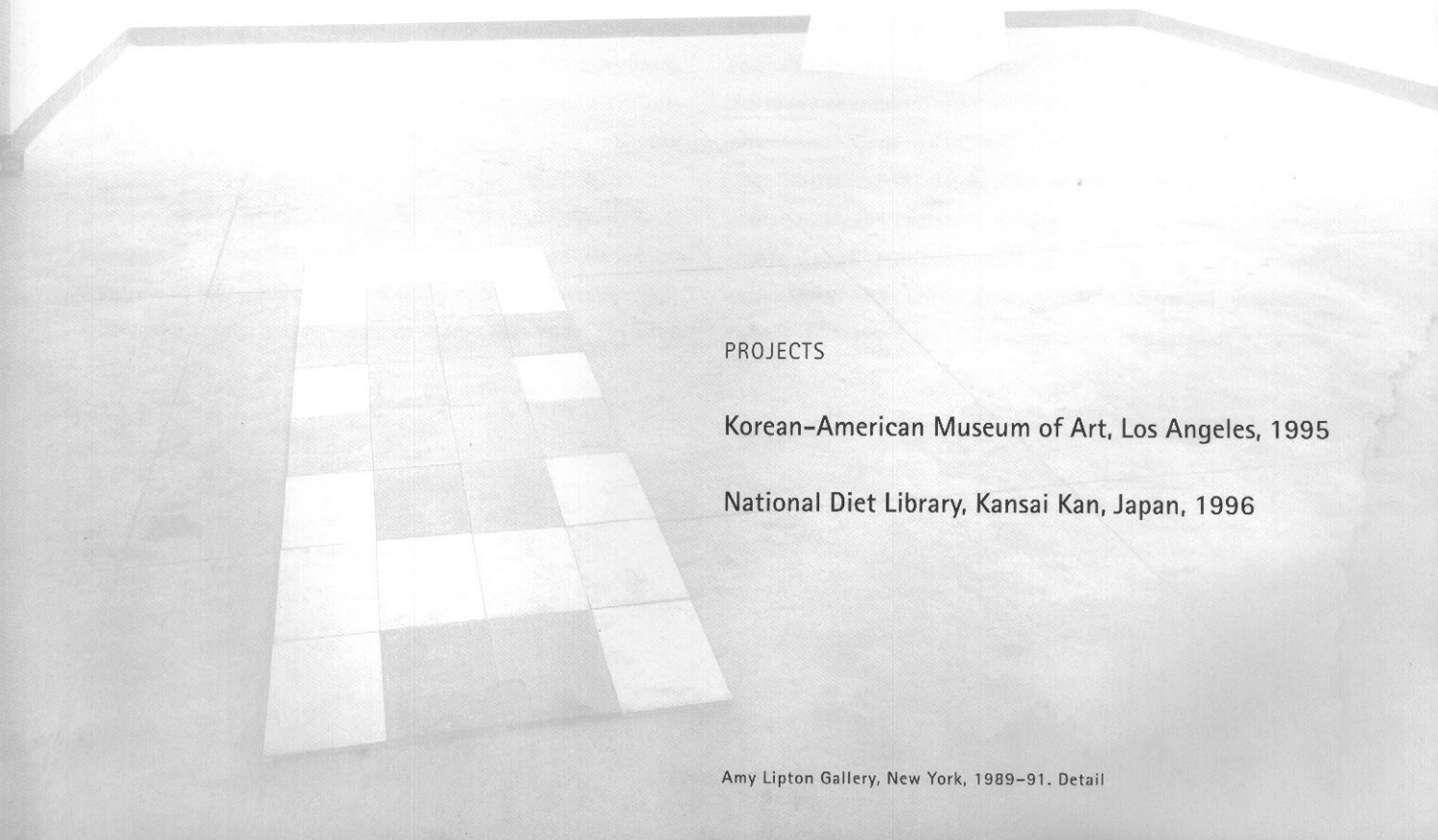
Field

"The order is not rationalistic and underlying but is simply order,

Conditions

like that of continuity, one thing after another."

DONALD JUDD



PROJECTS

Korean-American Museum of Art, Los Angeles, 1995

National Diet Library, Kansai Kan, Japan, 1996

Amy Lipton Gallery, New York, 1989–91. Detail

The field describes a space of propagation, of effects. It contains *no matter or material points*, **rather functions, vectors and speeds. It describes local relations of difference within fields of celerity, transmission or of careering points, in a word, what Minkowski called the** *world*." SANFORD KWINTER, 1986[1]

01 FROM OBJECT TO FIELD

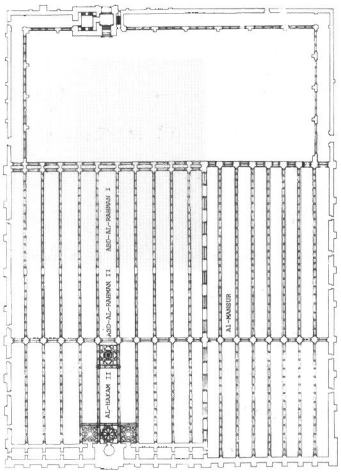
Field conditions moves from the one toward the many, from individuals to collectives, from objects to fields. In its most complex manifestation, the concept of field conditions refers to mathematical field theory, to nonlinear dynamics, and to computer simulations of evolutionary change. However, my understanding of field conditions in architecture is somewhat distinct from its more exact meaning in the physical sciences. I intend the phrase to resonate with a more tactical sense, as it would for an anthropologist or a botanist engaged in "fieldwork," for a general facing the field of battle, or the architect who cautions a builder to "verify in field." My concern parallels a shift in recent technologies from the analog to the digital. It pays close attention to precedents in visual art, from the abstract painting of Piet Mondrian in the 1920s to minimalist and postminimalist sculpture of the 1960s. Postwar composers, as they moved away from the strictures of serialism, employed concepts such as "clouds" of sound or, in the case of Iannis Xenakis, "statistical" music in which complex acoustical events cannot be broken down into their constituent elements.[2] The infrastructural elements of the modern city, by their nature linked together in open-ended networks, offer another example of field conditions in the urban context. A complete examination of the implications of field conditions in architecture would necessarily reflect the complex and dynamic behaviors of architecture's users, and speculate on new methodologies to model program and space.

To generalize, a field condition could be any formal or spatial matrix capable of unifying diverse elements while respecting the identity of each. Field configurations are loosely bound aggregates characterized by porosity and local interconnectivity. Overall shape and extent are highly fluid and less important than the internal relationships of parts, which determine the behavior of the field. Field conditions are bottom-up phenomena, defined not by overarching geometrical schemas but by intricate local connections. Interval, repetition, and seriality are key concepts. Form matters, but not so much the forms of things as the forms *between* things.

Field conditions cannot claim to produce a systematic theory of architectural form or composition. The theoretical model proposed here anticipates its own irrelevance when faced with the realities of practice. These are working concepts derived from experimentation in contact with the real.

0.2 GEOMETRIC VS. ALGEBRAIC COMBINATION

The diverse elements of classical architecture are organized into coherent wholes by means of geometric systems of proportion.



The Great Mosque of Cordoba, Spain, c. 785–800. Shaded area indicates original extent

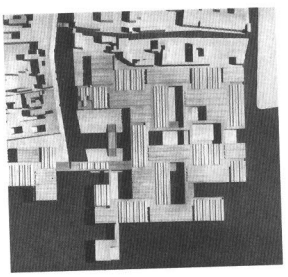
Although ratios can be expressed numerically, the relationships intended are fundamentally geometric. Alberti's well know axiom that "Beauty is the consonance of the parts such that nothing can be added or taken away" expresses an ideal of organic geometric unity. The conventions of classical architecture dictate not only the proportions of individual elements but also the relationship between individual elements. Parts form ensembles which in turn form larger wholes. Precise rules of axiality, symmetry, or formal sequence govern the organization of the whole. Classical architecture displays a wide variation on these rules, but the principle of hierarchical distribution of parts to whole is constant. Individual elements are maintained in hierarchical order by extensive geometric relationships in order to preserve overall unity.

The Great Mosque of Cordoba, Spain, constructed over a span of nearly eight centuries, offers an instructive counterexample.[3] The form of the mosque had been clearly established: an enclosed forecourt, flanked by a minaret tower, opening onto a covered space for worship (perhaps derived from market structures, or adapted from the Roman basilica). The enclosure is loosely oriented toward the *qibla*, a continuous prayer wall marked by a small niche (the *mihrab*). In the first stage of construction (c. 785–800) the typological precedent was respected, resulting in a simple structure of ten parallel walls perpendicular to the *qibla*. These walls, supported on columns and pierced by arches, defining a covered space of equal dimension to the open court. The arched walls operate in counterpoint to the framed vistas across the grain of the space. The columns are located at the intersection of these two vectors, forming an undifferentiated but highly charged field. This field generates complex parallax effects that prey on visitors as they move through the space. The entire west wall is open to the courtyard, so that once within the precinct of the mosque there is no single entrance. The axial, processional space of the Christian church gives way to a nondirectional space, a serial order of "one thing after another."[4]

The mosque was subsequently enlarged in four stages. Significantly, with each addition the fabric of the original has remained substantially intact. The typological structure is reiterated at larger scale, while the local relationships have remained fixed. By comparison with classical Western architecture, it is possible to identify

contrasting principles of combination: one *algebraic*, working with numerical units combined one after another, and the other *geometric*, working with figures (lines, planes, solids) organized in space to form larger wholes.[5] In Cordoba, for example, independent elements are combined additively to form an indeterminate whole. The relations of part to part are identical in the first and last versions constructed. The local syntax is fixed, but there is no overarching geometric scaffolding. Parts are not fragments of wholes, but simply parts. Unlike the idea of closed unity enforced in western classical architecture, the structure can be added onto without substantial morphological transformation. Field configurations are inherently expandable; the possibility of incremental growth is anticipated in the mathematical relations of the parts.

It could be argued that there are numerous examples of classical Western buildings that have grown incrementally and have been transformed over time. St. Peter's in Rome, for example has an equally long history of construction and rebuilding. But there is a significant difference. At St. Peter's, additions are morphological transformations, elaborating and extending a basic geometric schema, and tending toward compositional closure. This contrasts with the mosque at Cordoba where each stage replicates and preserves the previous stage of construction by the addition of similar parts. And at Cordoba, even in later stages when the mosque was consecrated as Christian church and a Gothic cathedral was inserted into the continuous and undifferentiated fabric of the mosque, the existing spatial order resisted the central or axial focus typical of the Western church. As Rafael Moneo has observed: "I do not believe that the Cordoba Mosque has been destroyed by all these modifications. Rather, I think that the fact that the mosque continues to be itself in face of all these interventions is a tribute to its own integrity."[6]



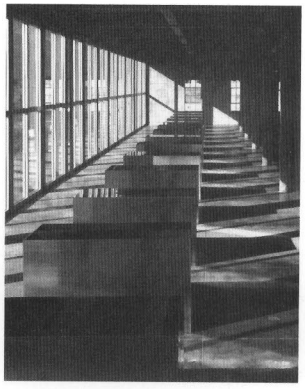
Le Corbusier, Venice Hospital, 1964–65

To briefly extend the argument to a more recent example, Le Corbusier's Venice Hospital (1964–65) employs a syntax of repeated self-same parts, establishing multiple links at its periphery with the city fabric. The project develops horizontally, through a logic of accumulation. The basic block of program, the "care unit" formed of twenty-eight beds, is repeated throughout. Consulting rooms occupy open circulation spaces in the covered areas between. The rotating placement of blocks establishes connections and pathways from ward to ward, while the displacement of the blocks opens up voids within the horizontal field of the hospital. There is no single focus, no unifying geometric schema. As in the mosque at Cordoba, the overall form is an elaboration of conditions established locally.[7]

0.3 WALKING OUT OF CUBISM

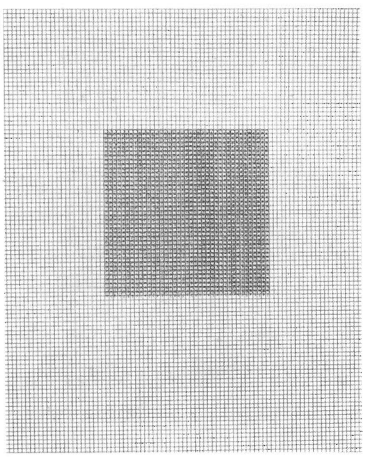
Barnett Newman, it has been said, used a sequence of plane/line/plane to "walk out of the imperatives of cubist space and close the door behind him."[8] The story of postwar American painting and sculpture is in large part a story of this effort to move beyond the limits of cubist compositional syntax. Sculptors in particular, working under the shadow of the achievements of abstract expressionist painting, felt that a complex language of faceted planes and figural fragments inherited from prewar European artists was inadequate to their larger ambitions. It is out of this sense of exhaustion that minimalism emerged in the mid-sixties. Robert Morris's refusal of composition in favor of process, or Donald Judd's critique of "composition by parts" evidence this effort to produce a new model for working that might be as simple and immediate as the painting of the previous decades they so admired.

Minimalist work of the sixties and seventies sought to empty the artwork of its figurative or decorative character in order to foreground its architectural condition. The construction of meaning was displaced from the object itself to the spatial field between the viewer and the object: a fluid zone of perceptual interference, populated by moving bodies. Artists such as Carl Andre, Dan Flavin, Morris, and Judd sought to go beyond formal or compositional variation to engage the space of the gallery and the body of the viewer. In written statements, both Judd and Morris express their skepticism toward European (i.e., cubist) compositional norms. They place their work instead in the context of recent American developments.



Donald Judd, installation view, Marfa, Texas

As Morris wrote: "European art since Cubism has been a history of permuting relationships around the generāl premise that relationships should remain critical. American art has developed by uncovering successive premises for making itself."[9] Both Morris and Judd single out Jackson Pollock for his decisive contribution. Judd notes that "Most sculpture is made part by part, by addition, composed." For Judd, what is required is consolidation: "In the new work the shape, image, color and surface are single and not partial and scattered. There aren't any neutral or moderate areas or parts, any connections or transitional areas."[10] The aspirations of minimalist work are therefore toward unitary forms, direct use of industrial materials, and simple combinations: a "pre-executive" clarity of intellectual and material terms. Minimalism's decisive tectonic shift activated the viewing space and reasserted the artwork's condition as "specific object."

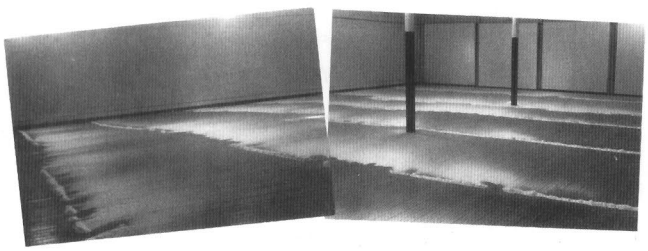


RIGHT: Eva Hesse, untitled, 1967

BELOW: Barry Le Va: *Bearings Rolled* (six specific instants; no particular order), 1966–67

And yet if minimalism represents a significant overturning of prewar compositional principles, it remains indebted to certain essentializing models in its reductive formal language and use of materials. Its objects are clearly delimited and solidly constructed. (Judd's later architectural constructions confirm this essential tectonic conservatism.) Minimalism develops in sequences, but rarely in fields. It is for this reason that the work of artists usually designated "postminimal" is of particular interest here.[11] In contrast to Andre or Judd, the work of artists such as Bruce Nauman, Lynda Benglis, Keith Sonnier, Alan Saret, Eva Hesse, and Barry Le Va is materially diverse and improper. Words, movement, technology, fluid and perishable materials, representations of the body—all of these "extrinsic" contents that minimalism had repressed—return. Postminimalism is marked by hesitation and ontological doubt where the minimalists are definitive; it is painterly and informal where the minimalists are restrained; it remains committed to tangible things and visibility where the minimalists are concerned with underlying structures and ideas. These works, from the wire constructions of Alan Saret to the pourings of Lynda Benglis to the "nonsites" of Robert Smithson, introduce chance and contingency into the work of art. They shift even more radically the perception of the work, from discrete object to a record of the process of its making in the field.

The artist who moves most decisively in the direction of what I am calling field conditions is Barry Le Va. Partly trained as an architect, Le Va is acutely aware of the spatial field implicated by

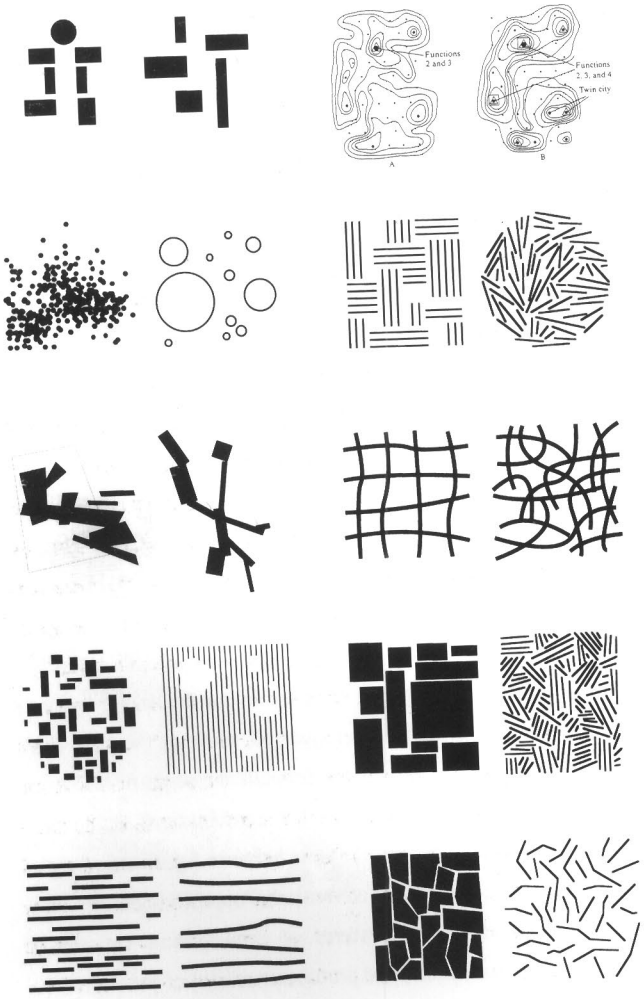


Barry Le Va, *Six Blown Lines*, 1969

the sculptural work. Beginning in the mid-sixties, he began making pieces, some planned in advance, others incorporating random process, that thoroughly dissolve the idea of "sculpture" as a delimited entity, an object distinct from the field it occupies. He called these works "distributions": "Whether 'random' or 'orderly' a 'distribution' is defined as 'relationships of points and configurations to each other' or concomitantly, 'sequences of events.'"[12] Local relationships are more important than overall form. The generation of form through "sequences of events" is somewhat related to the generative rules for flock behavior or algebraic combination. Le Va signals a key compositional principle emerging out of postminimalism: the displacement of control to a series of intricate local rules for combination, or as a "sequences of events," but not as an overall formal configuration. In the case of postminimalism, this is often related to material choices. When working with materials such as wire mesh (Saret), poured latex (Benglis), or blown flour (Le Va), the artist simply cannot exercise a precise formal control over the material. Instead the artist establishes the conditions within which the material will be deployed, and then directs its flows. In the case of Le Va's pieces of felt cloth, it is a matter of relating fold to fold, line to line. In later works from the sixties, the materials themselves become so ephemeral as to function as a delicate registration of process and change.

0.4 THICK 2D: MOIRÉS, MATS

All grids are fields, but not all fields are grids. One of the potentials of the field is to redefine the relation between figure and ground. If we think of the figure not as a demarcated object read against a stable field, but as an effect emerging from the field itself—as moments of intensity, as peaks or valleys within a continuous field—than it might be possible to imagine figure and field as more closely allied. What is intended here is a close attention to the production of difference at the local scale, even while maintaining a relative indifference to the form of the whole. Authentic and productive social differences, it is suggested, thrive at the local level, and not in the form of large scale semiotic messages or sculptural forms. Hence the study of these field combinations would be a study of models that work in the zone between figure and abstraction, models that refigure the conventional opposition between figure and abstraction, or systems of organization capable of producing vortexes, peaks, and protuberances out of individual elements that are themselves regular or repetitive.



Field conditions diagrams

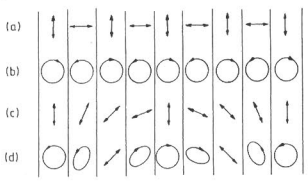
A moiré is a figural effect produced by the superposition of two regular fields. Unexpected effects, exhibiting complex and apparently irregular behaviors result from the combination of elements that are in and of themselves repetitive and regular. But moiré effects are not random. They shift abruptly in scale, and repeat according to complex mathematical rules. Moiré effects are often used to measure hidden stresses in continuous fields, or to map complex figural forms. In either case there is an uncanny coexistence of a regular field and emergent figure.

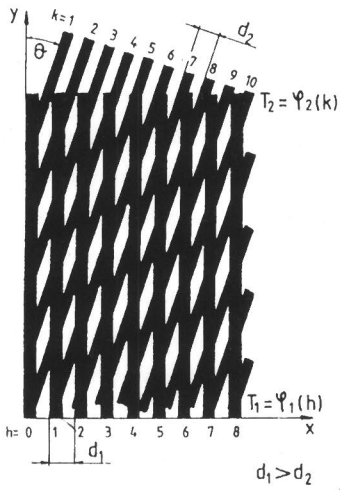
In the architectural or urban context, the example of moiré effects begs the question of the surface. The field *is* fundamentally a horizontal phenomenon—even a graphic one—and all of the examples described thus far function in the plan dimension. Although certain postmodern cities (Tokyo for example) might be characterized as fully three dimensional fields, the prototypical cities of the late twentieth century are distinguished by horizontal extension. What these field combinations seem to promise in this context is a thickening and intensification of experience at specified moments within the extended field of the city. The monuments of the past, including the skyscraper, a modernist monument to efficient production, stood out from the fabric of the city as privileged vertical moments. The new institutions of the city will perhaps occur at moments of intensity, linked to the wider network of the urban field, and marked by not by demarcating lines but by thickened surfaces.

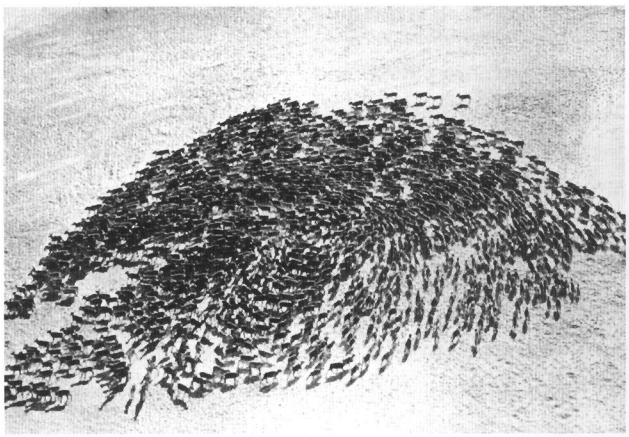
LEFT: Moiré pattern

BELOW: Diagram of moiré grates

BOTTOM: Reindeer herd reacting to helicopter overhead



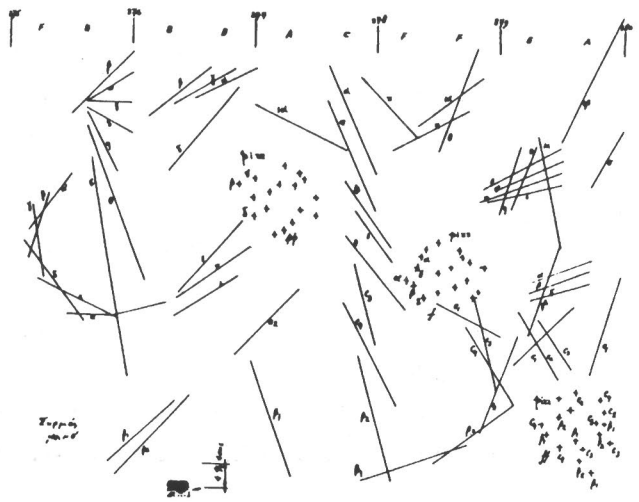




0.5 **FLOCKS, SCHOOLS, SWARMS, CROWDS**

In the late 1980s, artificial intelligence theorist Craig Reynolds created a computer program to simulate the flocking behavior of birds. As described by M. Mitchel Waldrop in *Complexity: The Emerging Science at the Edge of Order and Chaos*, Reynolds placed a large number of autonomous, birdlike agents, which he called "boids," into an on-screen environment. The boids were programmed to follow three simple rules of behavior: first, to maintain a minimum distance from other objects in the environment (obstacles as well as other boids); second, to match velocities with other boids in the neighborhood; third, to move toward the perceived center of mass of boids in its neighborhood. As Waldrop notes: "What is striking about these rules is that none of them said "Form a flock"...the rules were entirely local, referring only to what an individual boid could do and see in its own vicinity. If a flock was going to form at all, it would have to do so from the bottom up, as an emergent phenomenon. And yet flocks *did* form, every time."[13]

The flock is clearly a field phenomenon, defined by precise and simple local conditions, and relatively indifferent to overall form and extent. Because the rules are defined locally, obstructions are not catastrophic to the whole. Variations and obstacles in the environment are accommodated by fluid adjustment. A small flock and a large flock display fundamentally the same structure. Over many iterations, patterns emerge. Without repeating exactly, flock behavior tends toward roughly similar configurations, not as a fixed type, but as the cumulative result of localized behavior patterns.



Iannis Xenakis, Syrmos, 1959. Graphic version of "fixed states" before transcription

Crowds present a different dynamic, motivated by more complex desires, and interacting in less predictable patterns. Elias Canetti in *Crowds and Power* has proposed a broader taxonomy: *open* and *closed* crowds; *rhythmic* and *stagnating* crowds; the *slow* crowd and the *quick* crowd. He examines the varieties of the crowd, from the religious throng formed by pilgrims to the mass of participants in spectacle, even extending his thoughts to the flowing of rivers, the piling up of crops, and the density of the forest. According to Canetti, the crowd has four primary attributes: "The crowd always wants to grow; Within a crowd there is equality; The crowd loves density; The crowd needs a direction."[14] The relation to Reynolds' rules outlined above is oblique, but visible. Canetti, however, is not interested in prediction or verification. His sources are literary, historical, and personal. Moreover, he is always aware that the crowd can be liberating as well as confining, angry and destructive as well as joyous.

Composer Iannis Xenakis conceived his early work *Metastasis* as the acoustical equivalent to the phenomenon of the crowd. Specifically, he was looking for a compositional technique adequate to express powerful personal memories:

> Athens—an anti-Nazi demonstration—hundreds of thousands of people chanting a slogan which reproduces itself like a gigantic rhythm. Then combat with the enemy. The rhythm bursts into an enormous chaos of sharp sounds; the whistling of bullets; the crackling of machine guns. The sounds begin to disperse. Slowly

> silence falls back on the town. Taken uniquely from an aural point of view and detached from any other aspect these sound events made out of a large number of individual sounds are not separately perceptible, but reunite them again and a new sound is formed which may be perceived in its entirety. It is the same case with the song of the cicadas or the sound of hail or rain, the crashing of waves on the cliffs, the hiss of waves on the shingle.[15]

In attempting to reproduce these "global acoustical events," Xenakis drew upon his own considerable graphic imagination, and his training in descriptive geometry to invert conventional procedures of composition. That is to say, he began with a graphic notation describing the desired effect of "fields" or "clouds" of sound, and only later reduced these graphics to conventional musical notation. Working as he was with material that was beyond the order of magnitude of the available compositional techniques, he had to invent new procedures in order to choreograph the "characteristic distribution of vast numbers of events."[16]

Crowds and swarms operate at the edge of control. Aside from the suggestive formal possibilities, with these two examples architecture could profitably shift its attention from its traditional top-down forms of control and begin to investigate the possibilities of a more fluid, bottom-up approach. Field conditions offers a tentative opening in architecture to address the dynamics of use, behavior of crowds, and the complex geometries of masses in motion.

0.6 DISTRIBUTED INSTITUTIONS

There exists a strong historical connection between the precise rules of axiality, symmetry, and formal hierarchy that govern classical architecture and the traditional type-forms of Western institutions. The library, the museum, and the concert hall, as much as the bank, the city hall, or the capitol all appeal to the stability of classical order to signify their status as durable institutions. In the twentieth century, the utopian programs of early modern architecture sought to render the institutions of liberal democracy as transparent bodies. Lightweight steel skeletons and glass curtain walls signaled literal transparency, while a functional and compositional dynamic made visible the separate elements of these increasingly complex programs.

However, the extent to which compositional shifts are capable of refiguring these institutions reaches a limit. On the one hand, it should be noted that while the rules of combination may be new in these modernist compositions of fragments, the classical assumption that composition is concerned with the arrangement of and connections among those parts persists. As Robert Morris has put it, "European art since Cubism has been a history of permuting relationships around the general premise that *relationships should remain critical.*"[17] Perhaps a more radical shift is required. This is all the more urgent given that, under the pressure of technological or societal shifts, institutions are changing from within. As the social, political, and technical roles of those institutions are called into question, the corresponding typologies lose their special capacity

to order and represent the space of these institutions. In the case of the library or the museum, what was once a place of certainty, an orderly deposit of knowledge arranged in familiar and agreed-upon categories, has been eroded by the onrush of media, consumer culture, and telecommunications. Architecture's capacity to represent and shelter that collective memory has in turn withered. To design a library or a museum today is to contend with an entirely new set of expectations. Above all, it means to recognize an ever increasing uncertainty about what constitutes knowledge, who has access to it and how it is distributed.

There are no simple equations of organization and behavior, of politics and form. As Michel Foucault has pointed out, while there are constraining architectures, there are no specifically "liberating" architectures. "Liberty," he says, "is a practice."[18] Nonhierarchical compositions cannot guarantee an open society or equality in politics. Democracy, it has been said, has less to do with the ability to do things as with the ability to undo things. The goal, therefore, in the final two projects presented in this volume is to rethink conventional institutional form through the concept of the field. The organizational principles proposed here suggest new definitions of "parts," and alternative ways of conceiving the question of relationships among those parts. The form of these institutions does not attempt to represent, metaphorically, the new condition of the institution, nor does it attempt to directly instigate new ways of thinking or behaving. Instead, by forming the institution within a directed field condition, connected to the city or the landscape, a space is left for the tactical improvisations of future users. A "loose fit" is proposed between activity and enclosing envelope.

Michel Serres's reminder that static, accidents, and disruptions will inevitably undermine any formal system defined by points and lines is not so far from what is intended here. More than a formal configuration, the field condition implies an architecture that admits change, accident, and improvisation. It is an architecture not invested in durability, stability, and certainty, but an architecture that leaves space for the uncertainty of the real:

> Stations and paths together form a system. Points and lines, beings and relations. What is interesting might be the construction of the system, the number and disposition of stations and paths. Or it might be the flow of messages passing through the lines. In other words, a complex system can be formally described....One might have sought the formation and distribution of the lines, paths, and stations, their borders, edges and forms. But one must write as well of the interceptions, of the accidents in the flow along the way between stations...What passes may be a message but parasites (static) prevent it from being heard, and sometimes, from being sent.[19]

NOTES:

1. Sanford Kwinter, "La Cittá Nuova: Modernity and Continuity" in *Zone 1/2* (New York, 1986), 88–9, emphasis added.
2. Xenakis uses language and concepts very close to those suggested here. See Nouritza Matossian, *Xenakis* (London: Kahn and Averill, 1990), 59.
3. The following discussion was adapted from Rafael Moneo: "La Vida de los edifcios" *Arquitecture* 256, (Sept.–Oct. 1985): 27–36.
4. This phrase is taken from Donald Judd's discussion of the paintings of Frank Stella: "The order is not rationalistic and underlying but is simply order, like that of continuity, one thing after another." Donald Judd, "Specific Objects," in *Complete Writings: 1959–1975* (Halifax: Nova Scotia College of Art and Design, 1975), 184.
5. The term *algebra* derives from the Arabic *al-jebr* "the reunion of broken parts." *Geometry*, on the other hand, is a word of Greek origin.
6. Moneo, "La Vida," 35.
7. Both the mosque at Cordoba and Le Corbusier's Venice Hospital figure in Alison Smithson's 1974 article "How to Recognise and Read Mat-Building," *Architectural Design* XLIV, 9 (1974): 573–90.
8. Cited in Rosalind Krauss, "Richard Serra: Sculpture Redrawn," *Artforum* (May 1972).
9. Robert Morris, "Anti Form," *Artforum* (April 1968), 34.
10. Judd, "Specific Objects," 183.
11. In fact, postminimalism developed at nearly the same time as minimalism. "Post" here implies a certain degree of dependence and opposition rather than chronological sequence. Note, for example, the absence of women in the ranks of the minimalists; postminimalism would be unthinkable without the contributions of Lynda Benglis or Eva Hesse. A certain fluidity in these categories is also required; Robert Morris, for example, is often grouped with the postminimalists. See Robert Pincus-Witten, "Introduction to Postminimalism" (1977) in *Postminimalism to Maximalism: American Art, 1966–1986* (Ann Arbor, MI: UMI Research Press, 1987).
12. Jane Livingston, "Barry Le Va: Distributional Sculpture," *Artforum* (November 1968).
13. M. Mitchel Waldrop, *Complexity: The Emerging Science at the Edge of Order and Chaos* (New York: Simon and Schuster, 1992), 240–1.
14. Elias Canetti, *Crowds and Power* (New York: Farrar, Straus and Giroux, 1984), 29.
15. Matossian, *Xenakis*, cited from an interview, 58.
16. Ibid., 58–9.
17. Morris, "Anti Form," 34, my emphasis.
18. Michel Foucault, "Nietzsche, Genealogy, History" in *The Foucault Reader*, ed. Paul Rabinow (New York: Pantheon, 1984), 87.
19. Michel Serres, *The Parasite*, trans. Lawrence R. Schehr (Baltimore: Johns Hopkins University Press, 1982), 10–1.