The Assemblage of Exchange:
Housing, Industry and the Potential Mall

by
Ronald J. Eng
Bachelor of Science in Art and Design
Massachusetts Institute of Technology, 1991

Submitted to the Department of Architecture in Partial Fulfillment of the Requirements for the Degree of Master of Architecture at the Massachusetts Institute of Technology.

February, 1994

Signature of Author

Ronald J. Eng,
Department of Architecture,
January 14, 1994

Certified by

Fernando P. Domeyko
Senior Lecturer of Architecture,
Thesis Supervisor

Accepted by

Rosemary Grimshaw, Chairperson,
Department Committee for Graduate Studies,
Assistant Professor of Architecture

© 1994 Ronald J. Eng. All rights reserved.
The Author hereby grants to M.I.T. permission to reproduce and to distribute publicly paper and electronic documents copies of this thesis document in whole or in part.
1 “Mall”, 1. A shady public walk or promenade. 2. a. A street lined with shops and closed to vehicles. c. A large building or complex of buildings containing various shops, businesses, and restaurants usually accessible by common passageways. —definition from the American Heritage Dictionary.
The Assemblage of Exchange: Housing, Industry and the Potential Mall
by
Ronald J. Eng
Submitted to the Department of Architecture on January 14, 1994, in partial fulfillment of the requirements for the Degree of Master of Architecture at the Massachusetts Institute of Technology.

Abstract
This thesis is interested in examining a contemporary generative method for approaching design in urban areas. It considers the levels of interactions in the city in which the questions of architecture are clearly affected by the conditions of this new information age.

One cannot ignore that within the built living-working dynamic of the modern city there are new circumstances emerging that may generate new building types. For example, the viability of the “home-office” can offer new advantages socially, economically and culturally, but also present particular difficulties for issues of public and private. Similarly, the reemergence of a new industrial city with its light industries (computer science, biological, pharmaceutical and genetics etc.) brings new conditions and (anti-zoning) possibilities for inhabiting varying uses in close proximity.

The initial assumption is that any intervention in the urban landscape must recognize action of the physical / spatial field of the built environment with the patterns of use and culture. It specifically asks that the architecture be rooted in time and place. With that assumption, the design philosophy must be inclusive of the needs and conditions of the setting in question. My observations and experiences have led me to believe that a strength within the complexities of urban life, is in the potential for exchange in many aspects of city living. Given the densities and information technologies available and the range of inhabitants’ experiences and cultures involved, one can claim that the situation of the city can be enriched by an architecture of built reciprocity at the many sizes and perceptions. Concurrently, with the consideration of technology’s effect not only on specific architectural situations but also upon the design methodology, an aspect of this thesis probes the influence of computational tools (as well as traditional techniques) upon its architecture.

The vehicle for these ideas is in the design of a multi-use development for the city of Cambridge, Massachusetts. It is an interpretation of a current proposal, of which a 2.3 million square foot program and site have been adapted.

Thesis Advisor: Fernando P. Domeyko
Title: Senior Lecturer of Architecture
Acknowledgments

...for my parents and family.
Special Thanks:

to my Prof's
For their teaching and example
without whom the mind and work would have little to say

Fernando
for questions that hit home
Maurice
for all the stuff in my head
Imre
for granting me sanity in the end

to my
Friends
and fellow
Radhikal Night Owls
for allowing the procrastination to not have been in vain.

to the M.I.T. syndicate
Barry, Tom, Kairos, Don, Mark, and Amy
for things I've still not forgotten.

and to Kathy
for it all...

And now," cried Max, "let the wild rumpus start!"
Table of Contents

Abstract pg. 3
Acknowledgments pg. 4

I. Introduction: a. The Problem pg. 9
b. The Story pg. 11
c. Methods / Attitudes pg. 13
d. Breakdown of associative sizes/ dimensions pg. 14

II. Research: a. Thinking About Urban pg. 17
b. Multi-Use pg. 21
c. Mega-Structure pg. 29

III. Research: a. Building Types pg. 39
b. Generic Principals pg. 39
c. Industry Old/ New pg. 41
d. Housing pg. 51
a. Streets/Malls pg. 61

IV. Research: Light pg. 65
Material and Structure pg. 76

Le Corbusier, Carpenter Center, Cambridge
<table>
<thead>
<tr>
<th>Section</th>
<th>Project</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>V.</td>
<td>Project:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Site</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>b. Description</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>c. Site Analysis</td>
<td>100</td>
</tr>
<tr>
<td>Vi.</td>
<td>Project:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Main References</td>
<td>104</td>
</tr>
<tr>
<td>VII.</td>
<td>Project:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Proposal:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description of Work and Intentions</td>
<td>117</td>
</tr>
<tr>
<td></td>
<td>b. Documentation of drawings models</td>
<td>118</td>
</tr>
<tr>
<td>VIII.</td>
<td>Photo Credits</td>
<td>165</td>
</tr>
<tr>
<td>X.</td>
<td>Bibliography</td>
<td>171</td>
</tr>
</tbody>
</table>
Home, meeting-place, and factory; polity, culture, and art have still to be united and wrought together, and this task is one of the fundamental tasks of our civilization. Once that union is effected, the long breach between art and life, which began with the Renaissance, will be brought to an end.

- Lewis Mumford, Sticks and Stones
II. Introduction:

a. The Problem

The orientation of this country toward the disassociation of work and dwelling is a difficulty. Developing from this somewhat hedonistic condition is a suffering in the quality of production, not strangely along with an increase in the growth of leisure and entertainment. With this country’s strong individualism driving much of this, we have long been moving away from the possibilities of an associative environment. Additionally, diurnal and spatial separations not only contribute to urban blight but have a similarly negative effect on the social structure of families and community relationships. With the consideration that heavy industry has since moved out of the city to be replaced by new technologies and light industry, there has not been any equally new and reasonable attitude for the current living and working relationship.

The past zoning of uses in the city, presents us with this indication further. One can predict, however, that the future for building in the city will not be of singular uses separated. Even in the once great caverns of Downtown (Wall Street) Manhattan there are new residential forces emerging, not to mention the massive transformation of many industrial areas. We can conclude then that the Mixed-Use developments that have always been integral parts of cities should continue to occur and flourish. Areas such as Newbury Street, and Madison Avenue can serve Hollingworth’s Bridgecity.
Marco Polo imagined answering (or Kublai Khan imagined his answer) that the more one was lost in unfamiliar quarters of distant cities, the more one understood the other cities he had crossed to arrive there; and he retraced the stages of his journeys, and he came to know the port from which he set sail, and the familiar places of his youth, and the surroundings of home, and a little square of Venice where he gamboled as a child.

- Italo Calvino, Invisible Cities
as references, although as architects, we cannot generate all the urban forces that might make such a place, nor are we able to build the 19th century sense of "street", rather we build buildings thereby assembling the urban plan by specifics. This thesis should make projections toward a greater continuity of such specifics, one that brings into closer presence the varying activities of life within the contemporary densities and variations of urban culture.

b. The Story

Of personal self-importance, this thesis has great ambitions. As a product of two largely differing worlds bounded by my upbringing, education and travel, I've spent some effort trying to come to terms with the conflicts involved. To that end, I can believe that if the range of exploration in this work can encompass the range of my difficulties, then maybe the resulting work could endow some basis for future enterprises.

The story of the thesis began with an examination of the area in which I live. It was my seventh year in Cambridge and only recently had I been bestowed any understanding of the place. Always interested in cities, I had traveled to various places to take a look. This undertaking bracketed inquiry into city living in general, and eventually led me to the current topic; essentially, looking at the association of working and living environments. Originally, I had intended to design a series of small workshops and housing in Cambridge nearby my own residence. Pursuing this goal I found that too many assumptions as to the quality of the site had to be made. The more information sought, the larger and more seemingly arbitrary the assumptions.
Reaching this impasse, it was clear that the problem of the small site was inexplicably tied to the larger problem of the site in question. As a result, it was decided that it should be looked at more explicitly.

"Yet even apart from public foolishness and public officials, big physical planning is confusing and difficult. Every community plan is based on some: Technology, Standard of Living, Political and Economic Decision, Geography and History of Place."

- Percival and Paul Goodman
c. Methods / Attitudes

Attitudes on the architectural process have already, to some extent been revealed. The concern for improvement of urban living environments through appropriate architecture is at the forefront of the intentions. Continuing, the belief in direct, identifiable physical and perceptual effects, firmly establish the working method. With that, an examination of precedents is undertaken. The traditional commercial street system for example, is distinguished as a direct reference for the collective interaction of business and housing — along with its derivative covered and layered systems. Also to be discerned; the Multi-Use mass-developments of the Pacific Rim, the Mega-structural ideas of Tange and Rudolph among others and an examination of an Iranian Bazaar in the terms of suburban and urban “malls”.

Assumptions as to their qualities must then be made, the characteristics of which; urban forces, sizes, construction, and materials, must be clarified. To get close to the limits of the programmatic interactions, inquiry must be made into the cultural impacts and understandings of the various uses. If the effort is to identify the specific behaviors, then formal analysis would be a useful component in generating the form of exchange. With the aid of computational tools, the information sought can be described in terms of architectural issues of light, structure, and dimension as well as formal behavior (control systems), and perception (access and privacy, and other cues).
Such research seeks to connect the project for relevant qualities. The need to at least attempt an ambitious scope has to do with the need for making decisions based on real information.

d. Focus of associative sizes/dimensions

For the sake of this thesis the levels of association will be identified as particular but variable categories: The immediate or personal dimension (room), housing and its supports (building), the tissue (fabric), and lastly, the level of the city (landscape). The categories are by no means exclusive, but rather overlap, one leading directly into another. It is a means of directing the effort and as such, provide dimensional references.
The format of this document is the result of the various points of inquiry. It is not the most scientific of works as I am not the most scholarly of authors. It is very simply, some conglomeration of the thought processes and influences that have affected me over the course of a term (and beyond) with the hope of some sharing in the fruits of the work.
"The urban landscape, among its many roles, is also something to be seen, to be remembered and to delight in"
- Kevin Lynch

Walled City, Hong Kong
II. Research:

a. Thinking About Urban

The idea of urban is an enormously important issue for me. Often used in pessimistic terms, I believe the contrary to be true. Urban situations present the human condition in so many permutations, in a single understandable entity. The potential for exchanges of all sorts are at a maximum here. Even those aspects of the city which are often viewed as negative (pace & pressure) can be understood as the strength of the environment, albeit within a setting of changing extremes. With this in mind, how can building compliment these changes?

One reasonable approach is a grasping of what it means to be “rooted in time and place”. A concept introduced to me by Prof. Domeyko, it requests the identification of timely conditions. One such example is the new home-office mentioned earlier. This situation is made possible by availability of new technologies which give many profes-
sions the ability to communicate with larger groups, making less necessary the proximity that was originally assumed.

Advantages to this are numerous. Besides the lower costs of operating at two separate locations (this includes less overhead, non-existent commute, and “eating in”) there are social and perceptual advantages. The dual-income family for instance has had a negative impact on families. The advent of the home-office allows at least one of the working parents to take care of home and career. The other positive to this condition is in the increased connection of working and living. We already know that many of those who are well-connected to their profession, live their profession. It can be seen as an opportunity to have greater contact with the workplace; akin to the older craftsman of yesteryear (who often lived above or behind their place of business). The last advantage to mention is one of the idea of “eyes on the city”. The occurrence of a home-office system allows the particular area to be inhabited for the greater part of the day. The diurnal dangers of a Wall Street at night or a housing complex during the day are avoided. This policability would be accentuated by additional measures including continuous vehicular connection and the maintenance of visual continuity with well lighted thoroughfares.

At the larger scale there are whole systems that might benefit from larger mixed-use conditions. This is not to revive the old Mill Town idea or enclosed industrial city, but

Rockefeller Center, NYC
rather set a precedent for how public amenities set up by large corporations can benefit domestic fabrics by means of exchange. This asks not for chain-link fences but rather mutually available shared areas, that, at a minimum may be parkground or a public atrium, or at a maximum maintain real reciprocal accessways and services.

A clause to this approach is in the need for some perceivable separations of these basic facets of human existence. (leisure being the third) There is the simple pragmatic issue of the public and private relationships of these home-offices. For example, a reoccurring sight is the conversion of a room in a house to an office or workplace. When a client comes to visit this office that person has the uncomfortable (for both parties) circumstance of walking though the (potentially untidy) house to enter into what are essentially public dealings. Additionally, lack of spatial / perceptual differentiation between uses can become an obstacle in one's working mindset.

Other problems exist at the larger scale. More public businesses are often not appreciated in very domestic fabrics. The signage and access that is necessary for professional use is not always acceptable in a private sector. The question of how to accomplish the relationship and non-relationship of the working-living is one focus of this work. Since the problem is not just proximity, the solution seems
to be in a need for clear demarcations of public and private. Whether by section or orientation, there can be continuities and clearly defined territories of public and regions of private. Understanding of site lines can allow partial and variable enclosures for security and accessibility, while extending this attitude to the larger size once again, we can arrive at many references for this type of inter-connected architecture. More commonly known as multi-use building, it demands a focus of its own.

Our most enjoyable cities are those which weave together a rich and complex pattern of different uses and activities. As with any pattern or fabric, these cities need continual care and renewing - the mending and restitching of parts which run down or require change. A fabric of interwoven uses usually evolves over many years, in stages, temporarily reaching periods of economic and social equilibrium, only to change again. Critical to this process is the complementary nature of their uses - how they reinforce each other and how collectively they support everyday life. - Eberhard Zeidler

The greek Agora
b. Multi-Use

That our lives encompass multiple uses is clear. As a designer, one questions the way in which these differing uses occur, react, and can be deployed. The fact that most often they appear over time, the results of urban forces and transformation, are relevant. On one hand there is the issue of a developable infrastructure. In this case, one system provides some initiative for another system which in turn generates a deployment of uses and/or supports that allow growth. This set of decisions is complex and in the end, still begs for more clues.

from Rudofsky Loggia, Chinchon near Madrid
to be responsible for whole physical landscapes. Before the Industrial Revolution, describing buildings as multi-use would have seemed irrelevant. Such buildings existed as a matter of course and were integrated into the fabric of European towns and cities as well as their middle eastern counterparts. Only during the advent of modernism and Industrialism did we begin to hear of Utopias signifying the then symbolic end of the multi-use structure, not to mention the advent of use-zoning and other stark means of separation.

Yet multi-use buildings are not a placebo for urban problems. There are no guarantees that in certain situations a multi-use project would serve any better than single-use buildings. Even today too many massive multi-use complexes have been built with the same sweeping urban renewal intent witnessed in the 1950’s... Too often they have swallowed up the varied uses and activities along the street and sealed them into a monotonous indoor environment.

-Eberhard Zeidler

Robinson, Macau Ferry, Hong Kong

Sectional Perspective - Land Portion
So if we believe in the variation of life processes and must generate large-scale projects, but see that in the design of these projects, conventional forms of order do not seem to sufficiently address the issues of scale growth, adaptability and multiplicity that any reasonable built environment requires to survive and flourish, then the problem of deploying such uses in large steps present us with difficulties. The goal seems to be one of sensitivity to specific needs and conditions of the individual components within the large context, along with a method that similarly, though large and capable, is able to adapt to the particular circumstances of a given problem.

San Gimignano, Tuscany: working fabric at the range of sizes.

Paris Walkup; clearly successful example of multi-use building set as a repeatable module in a larger system; shops below, offices above, residences behind.
Hertzberger's Music Center, Utrecht, Germany
Given a large public use, pedestrian traffic will occur. The intensity of the definition serves to enhance what is essentially a movement system around an event. This happens both inside and out.
The Architects Collaborative, J. Quincy School, Boston, MA
This institutional "giving back to the street" serves to both increase its own useful territory and its neighbors. The gradual level changes of the plazas and its relative openness makes this project increasingly public in nature.
At the size of the city, we have seen that though general thematic similarities might occur in specified areas; materials, historic districts and such, there are inseparable connections of economics and society in use. Office complexes and Industrial Parks now easily spawn whole commercial districts. Policy makers and wealthy investors rely on the formulas of differing program and marketability. The simple sectional zoning of many of these projects offers little to the user and becomes more often a real-estate venture.

The possibility of IDZ's or independent development zones as they were called in a 1986 M.I.T. Studio taught by Prof. Halasz, propose that multiple levels of access -privacy relationships can occur up through the vertical of the building. Not only is this system interested in efficiency of construction and marketability, but also for the potential spatial richness and variability. Multiple levels of exchange would be possible and would coincide with a lessened reliance on the road. Now this is not to say that it is just building "options". A well designed system would have logical constraints and would react to specific site issues but additionally could provide a reasonable means of expansion along with dynamic public offerings.
Sert, Boston University Academic Complex
This institutional example brings into grouping an assemblage of many different uses. Its "student union" serves as a collective element in the cluster while the tower appropriates the larger relationship with the biggest public thing that is the river.

Habakken's Grunsfield Variations.
Facade Study: Jose Aldrete Haas
A look at control and cues at the level of elevation and entry.
We must invent and rebuild *ex novo* our modern city like an immense and tumultuous building site, active, mobile and everywhere dynamic, and the modern building like a gigantic machine...lifts must swarm up like serpents of glass and iron... (the street must) plunge storeys deep in to the earth, collecting the traffic of the metropolis and connected for necessary transfers to metal catwalks and high-speed conveyor belts.

- Antonio Sant'Elia (Banham pg19)
d. Mega-Structure:
This is a name with many connotations. On one hand it has long been seen as part of the city of tomorrow, able to bridge or burrow through long expanses, controlling the environment, and making large infrastructural connections. However the failure of this idea was in the final singularity of thinking.

What the sixties tried to produce, with its new building techniques and its increased technologies, was a "better" tomorrow. What was a valid attempt at solving problems of mass-use; housing transportation and working environments, eventually taking on large portions of fabric, failed because of the same simple ideas that test any design problem. It was simply too much.

Though synonymous with “large structure” mega structure evokes connotations of all encompassing design. It does seem strange that though growth and option is recognized in the system, it is only hierarchically accomplished. The mega-structure does everything and is everything. It allowed for very few independent decisions and essentially left most decisions at the point of the largest move. This in itself is a strange premise. If we talked of the need for specificity earlier, then surely the mega-structure disallowed it. As a uniformly distributed system virtually occurring for its own sake and ignoring its surroundings it seemed doomed as a stand alone method.

Desbarats, Pavillion Du Theme
The reliance on the structure to perform so many levels of definition was the essential mistake. There are many more systems and sub-systems that more happily and sensitively do the job. The advantages of orientation, span, containment, and reference that large structure possessed along with its method of expansion and construction, still remains as positives. Therefore, the use of a large structure as long as it is understood to be a large structure seems to be a reasonable and useful approach.

Kwon, Hong Kong University of Science and Technology, Hong Kong

With its surge of development, much of the Pacific Rim is building the large structure. Partially the result of overcrowded streets and outrageous land costs, the Large building system allow new planes of reference and improved connection and shelter (air conditioning, in this case) for whole areas and regions.
Wong, Tung, Taikoo Shing and Cityplaza, Hong Kong
Architects gone mad, this system of towers with
subsequent wreak of uniform distribution. This is the
example of ground dumping, with towers of no
direction or difference can go anywhere, be anywhere.

Safdie, Habitat, Montreal
Though composed of "unit" structure, it arrives at
mega-structural status in the worst way. Now devoid
of orientation and lacking any large referenceable
form, its "hill town" similarities cry out for a real hill to
sit on.
Banco de Buenos Aires
Essentially a series of large columns, its unusual interstitial space is generated by virtual free-standing structure, offering a similar relationship as Wright's Johnson Wax Columns or Kahn's Kimball Museum roof vaults.

Tange, Radio Building
This concrete mass is supported by habitable columns, some contain stairs, others contain bathrooms. Note the independence of the "tray action" with that of column position.
Kahn, Tomorrow's City Hall Project
Erector Set

Rudolph, Lower Manhattan Expressway Project
One system for all!

Tange, Tsukiji Redevelopment
The difficulty in this effort seems to be one of misfocus. In spanning such large distances at such a great height, the territory between structures is left for naught. The real potential in the project is in exactly those regions where the structure can potentially make an exchange.
Prague
"Doing the right thing the wrong way" as said by a certain proponent of large-spanning structure. Though the system is raised up into the air first, (having the potential of supporting multiple levels of territory below) it is just infilled.

Rogers, Tokyo Forum
A better example of raised large structure, it gains the very public space on the ground beneath. Seemingly siteless and futuristic, it still manages to bury the users above and below.
Hellmuth, Obata & Kasselbaum, Moscone Center, San Francisco
A convention center for the city, it does well to react to its varying sides with different parts of program and enclosure.

Chemetov, Ministry of Finance, Paris
A direct and brutal move, it nevertheless makes a civic attempt at air-rights development.
Adalaj, a stepwell
This unlikely large system is categorized as such because of its bigger-sense move. It brings into question the structure that is the ground and thereby makes sensitive connection to not only that but the other elements (sky, water, light) as well.

Taking advantage of nature's superstructure, these inhabitants intrinsically acknowledge the advantages of the partial containment. It offers shelter but is essentially open.
Candillis, Josaic, Woods, Toulouse le Mirail
This plan, mimicking fractal growth, manages to order expansion and provides infrastructural support but ends up as a central control system.

Behnisch / Otto, Olympic Stadium, Munich
Again the successful ground sky association, with both materials informing and providing definition.
Fiat-Lingotto, Turin
II. Research

a. Building Types

The rationalization for examination of some existing building types is doubly fold; Firstly, to acquaint myself with the particular requirements of these types today, and secondly to make the generalizations necessary, in order to make specific their interactions.

b. Generic Principals

The material in this section relies on the theory and vocabulary of many theses before mine. Because description of form is a job in itself and because I have used this materially selfishly much more than I have returned to it, I should not describe the method in depth. However, I wish to make the argument for its use in general.

The belief in intrinsic qualities is a way of interpreting and therefore relating much of what we see and come in contact with. It satisfies a desire for order in the world and offers a general way of referencing and describing form, an integral mode of thinking when one is concerned with form-making. This does not preclude other ways of looking and thinking, but rather offers some useful help. The examples in this section are a sort of picturebook. They are divided into fairly loose categories (as each category will tend to have aspects of another) and presented as a matter of documentation of my own process.

excerpted from Continuity, Stability and Exchange: Design Transformations of / projections for a Housing Project in Lahore by Mahmood Farugi

Continuity or the ability to move or allow movement or growth, is a sign of life in any thing or system...Space is in nature continuous. It allows things to move within it. Just as continuity or movement is necessary for the life of a system, stability or a state of rest is essential for that system to exist in time. Human need for stability is translated in the making of territory. Exchange is a function of social behavior. It is promoted by a need to share and in turn promotes communication and interchange leading to awareness and understanding.
c. Industry / Offices

The light industries that are potential inhabitants of the site include: Bio-Technical and Genetics Industries, Electrical Engineering and Computer Software/ Hardware Industries as well as more generic office types. This industrial nature that Cambridge is attracting is in part due to the influence of the universities that inhabit it, but in the end, still reflect overall trends away from heavy industry in the city.

One of the prime requirements for these structures is flexibility, such that it is flexible in reference to the mechanical systems necessary. Whether in the case of high-tech equipment needs or “clean rooms”, the tendency is for a branching of a main spine for distribution of mechanical as well as access and services.

Another issue often ignored but essential to the happy working of this type, is that of dimension. The need for natural light and landscape orientation is often ignored in contemporary towers and office structures. Some of the examples here present us with associative sizes and distances for light and access.
Note the direct method of distribution of both access and mechanical.

This example reveals a specific response to every portion of the program and its location. Sitting in the landscape this industry does well to make orientation out of its major components and join them together with a intensified sense of moving above and though.
Van Der Vlugt, Van Nelle Factory
The consummate glass and steel industrial vision, the building makes strong gestures of technology and material at several scales.

The day-night transformation is ever-more significant in cities where such difference can be blurred.

Note the definition at entry.
Hertzberger, Central Beheer
The effort in generating public nodes in the potentially uniform plan is commendable. It eventually falls on his ability to make three dimensional territory with the light and enclosure.
Wright, Johnson Wax Buildings
The proverbial standard for open-air offices, Wright celebrates the working situation with sculptural light and structure.
Behnisch, Diakonische Werkebunde
The advantage of visual continuity with several levels of public use are often at work in his projects. The layering, both in terms of enclosure and volume (through material and space), he manages a seemingly associative environment.
Esherick, Berkley School of Architecture
A reasonable effort in making definition at several sizes with a single material.

Rogers, Lloyds of London
Often relegated off to High Tech fashion, the building does make an attempt at a balance of integration of systems and clarification of parts.
Foster, Hong Kong-Shanghai Bank, Hong Kong
Not only does the structural system work at a myriad of levels in defining territory, but the precision and articulation of each system at its particular size is dizzying.
Co-Op Apartment, circa, 1920
d. Housing

A reference in this inquiry comes from the documents of Prof. John Habraken. His view of themes and variations allow one to generate housing form through the identification of conditions and potential intensifications. Thinking about structure with the added sense of supports, gives a spatial structuring to the way one demarcates the infra-housing uses. Also indispensable is the examination of modern housing prototypes, looking at the myriad of configurations of unit and block housing for their specific circumstances. With the added understanding of public/shared territory, along with the privacy and territorial controls, one can start to make decisions based on particular cultural and/or contextual situations. In terms of the project at hand the question arises as to the form of the living condition for a site with so many differing circumstances. The levels of interaction play a significant role here. Though there is the issue of exchanges at the larger size (shared collective semi-public), there is also the (living working) exchanges at the size of the unit. The assemblage of such exchanges into building is the goal that the references support.

Le Corbusier, Unite de Habitation, Marseille, France
Atelier 5, Students' Apartments at the University of Stuttgart

For lower-storeyed walk-ups the articulation of the vertical access offers the opportunity for collective territory.

Hertzberger, Haarlemmer Houttuinen, Amsterdam

Again, the street definition not only generates access in the right direction for exchange with the street but also offers several levels of interaction with, what is in this case, the larger access for a row-house system.
Piano, Block Housing,
The claiming of interior courts for the protection / use of the inhabitants is a worthy cause but may suffer from too much disassociation from the larger urban system. (If the streets have no life then the point is moot)

SITE, Highrise of Homes
An odd attempt at a real issue, this assembling of would be single-family detached houses in a large support system makes some sense. What is offered is a sense of individual intensification but still utilizing housing-level land and utility use. That the design is ignorant of its context and has no sectional sense of "street" relative to the "house" is a difficulty. However the work gets points for its use of a partially open courtyard.
Erskine, Byker, Newcastle upon Tyne
Steidle, Hardtberg, Bonn
Dobelaar, Kop St. Janshaven, Rotterdam
Both examples here are looked at for their use of a tertiary-loaded vertical access system. This has the advantage of reducing the discontinuity of section in virtual "sandwiches" (layered buildings with little interaction between layers).

Sert, Peabody Terrace
This project has the added claim of territory defined by its towers.
De Carlo, Urbino
The relationship of access and housing to the landscape, both in terms of orientation and also upon the ground.
Christine's, Mon Martre, Paris

Maki, Hillside Terrace
This is a great example of defined interior territory and layers of access - defined by a series of landscape moves and discontinuous building.
from Rudofsky, Via Cassari in Palermo
e. Commercial and Malls

The history of pedestrian malls can always, at best, be connected to the essence of the shopping street. Though the pragmatic issues of frontage and "circulation" are often the control, in the case of large structure and housing, there is the possibility of an urban mall that serves as a fabric distributor. In addition to serving its commercial cause, a raised access of this sort can offer sheltered passage to and from high density uses.

Von Gagern: Amalienpassage, Munich
Mengoni, Galeria Vittorio Emanuelle II, Milan
Eisenman, Cleveland Arcade
The Pontevecchio, Florence
Passerelle, Hanover
At the size of the fabric, this intervention attempts a serious layering of access that increases the public territory without forsaking light or visual continuity.
IV. Research:

a. Light, Structure and Material
Light in the corner: celebrates the corner in a particular way, offering more dynamic perspectives and field of vision.

Light in the corner: In the case of a solid structure, offers a substitution for what would normally be structure.

Scarpa, Plaster-Cast Gallery, Possagno
Hertzberger, Apollo School

Light defining Territory: In the case of the school, the skylight is directly associated with the collective element; occurring where the section is also understood.

Willemsparkschool (B)
Itakeskus Tower, Helsinki
Dimension of light.

Baltard, Les Halles Centrales
Direction of light.

Kepes, Light Mural
Form of the light.
Le Corbusier, Tokyo Museum
Form of the light: Structure

Smith, Blacman II, Manchester
Form of the light: Details

Smith, Harvard, MA
Form of the light: Surfaces
Light demarcating entry and other zones of public association.
Artificial light: referencing construction / surfaces
Material / Structure

Behnisch, Bohn Parliament
Screens: Spatial Depth / Visual

Behnisch, Hysolar Institute
Screens: Visual Depth / Spatial
Schneider-Wessling, Stadthaus Josefstrasse, Cologne

Screens defining territory.

Alcatraz

Levels of enclosure, exterior and interior.

Asplund, City Hall, Gothenburg, Sweden

Zone of structure, defining territory.
Thut, Max Plank-Strasse, Munich

Structure defining movement: along

Hauvette, Regional Chamber of Accounting

out

Prouve, ARB, Beam Transmitter, Koniz

and up
Polk, Hallalie Building, San Francisco

Fatepur Sikri, India
Foster, Hong Kong Shanghai Bank

The varying sizes and responsibilities of structure. Defining zone at enclosure, (in this case, for window cleaners)

Defining public at ground and privacy above.

Defining upper-public at the zone of largest structure.
Maki, Spiral Building, Tokyo

Kwon, Hong Kong University of Science and Technology

The image in the upper right corner will occur for forty pages terminating at the end of the section on project proposal documentation. What it is, is a series of frames that, when "flipped", will produce a low-tech animation.
Le Corbusier, Carpenter Center, Cambridge

Solids and light, defining vertical zones and territories.

from Rudofsky, Case Pensili

Alternation of light, defining depth and height.

Esherick, Monterey Bay Aquarium

Interlocking of solids to generate enclosure.
Mckim, Meade, & White, Pennsylvania Station, NYC  
Smith, Blackman II
Maybeck, First Church of Christ Scientist

Connection of differing materials / Exchange zone where concrete and wood pass.

Smith, Blackman II

Passing wood joint, high shear taken by metal joint.
Saarinen, Dulles International Airport, Wash. D.C.

Connection of building parts, supports to roof @ light

Tange, Gymansium, Tokyo

Expression of material: metal and concrete, tensile and compressive
Sha Tin, The New Territories, China

Scarpa,
Castelvechio,
Verona
Zahringer New Towns (Bern etc.), Victorian arcades, Newbury Street, & Transformed industrial sectors be reinterpreted towards a 'more livable'/humanistic' urban/architectural form in virtual continuities/reciprocities of access, building and landscape. (?)

If not, perhaps Mumford was right! "... in the hilarious upheaval of steel & stone... mechanical triumphs that once seemed like an advancing wave of the future now turn out to be a deadly undertow..."

-Maurice Smith

Courtyard, Kennedy Biscuit Lofts, Cambridge
V. Project

a. Site Introduction and description

The project site is set on what was once the location of the Simplex Wire & Cable Co. near Lafayette Square in Cambridgeport, Massachusetts. It is bounded by Landsdowne to the South, Brookline to the North, Mass. Ave. to the East, and Pacific to the West. It is situated in the area between Central Square and M.I.T. with an industrial scale to the north, east and south and a smaller domestic fabric to the west. The situation within industrial landscape enables the more institutional sizes of housing and/or larger commercial/ offices to potentially occur here. However the issue of exchange with the rest of Cambridgeport housing is an important issue. Additionally, the nature of this place is one of diverse racial, ethnic and class variation, a quality I feel helpful in the testing of these ideas.

The framework of the program and site is excerpted from a proposal from Forest City Development, for the University Park at M.I.T. Development. Their intentions for a Industrial “park” of approximately 2.3 million square feet of multi-use is what sets up the problem. The proposal makes claims of associations and connections to M.I.T. either via electronic network or through possible facility sharing.
Cambridge Map
At the Level of the City some site issues include the following:

a. Mass Ave. as the urban distributor. The site's frontage on this main Cambridge street gives it a major public component.

b. Similarly, its connection to the Charles River by Virtue of Brookline and Landesdowne along with its close proximity to Main St. adds to its potential central position.

c. The Mass Ave. Squares system may allow the site to evolve as a public hub, making the series: Porter Sq., Harvard Sq., Central Sq., Lafayette Sq.
View west along Mass. Ave. toward Harvard

View northeast along Mass. Ave. toward M.I.T.

View west Along Mass Ave. Looking at the intersection of Mass. Ave. and Main St. (Lafayettes Sq.)
View east along Franklin St.

View north along Brookline St.

View west along Pacific St.
Original Kennedy Biscuit Factory

Currently known as Kennedy Biscuit Lofts, mixed-income housing.

Necco Candy Factory
Aerial Photo of M.I.T. and outlying areas
Level of the Fabric Issues include:

a. Four distinct types of fabric converging at the site; Industrial, Housing, Commercial, Institutional exchanges with each are necessary if the project is going to improve conditions of the site.
b. The sizes and material that are associated with each fabric type
c. The barrier that is composed of the Railroad, Long Industrial structures and warehouses running East West along Vassar St.
Level of the Fabric: Movement
Level of the Fabric: Directions

Level of the Fabric, Use
Level of the Fabric: Immediate Site.
In our business the motives for analysis are naturally different. We do not undertake analyses of work to copy them or because we suspect them. We investigate the methods by which another has created his work, in order to set ourselves in motion. This approach should save us from regarding a work of art as something rigid, something fixed and unchanging. Exercises of this kind will guard us against creeping up to a finished product hoping to pick off what is most striking, and to make off with it.

- Paul Klee, The Thinking Eye
Rockefeller Center, N.Y.C., a grand example of mixing business and pleasure. The life of the area exists well into the night. Its connection to a major public thoroughfare (5th Avenue) is key.
Behnisch, Leybold AG
This industrial complex, though clearly efficient in its use of a service/access spine and fingering distribution, is a great example of worker to light relationships.
The collective elements are associated to the largest public thing, in this case, the landscape.
van Eyck: Orphanage (now Berlage Institute)

Analysis: Levels of interaction - partial containments and semi-public, semi-private space
Analysis: range of closed - open territories

Fatepur Sikri, India
Galfetti, Swimming Pool for the city of Bellinzona, Switzerland
A reference because of its use of an urban-sized move to, on one hand make connections, and on the other make an event out of the movement across. The registration of various water activities to the raised access provide a spectator-like role to the passer-by and similarly provide services for the pool users.
Scharoun, Gischwister School
This is a prime example of exchange at several sizes. Note, interconnection of the classrooms with their respective outdoor areas, the connection of those areas with the larger landscape. Also, the relationship of the lecture room with its access and the two in reference to the largest outdoor territory.
Transformational Diagram of pavillion to closed form. Aalto, Villa Mairea
Wright, transformation of closed toward open.
Great Grandfather's house, Taisan, China
VII. Project

a. Proposal: Description of Work and Intentions:

A. To generate a model for Mixed-Use deployment, both as a continuity of the city and as a particular environment of its own.

B. To examine with specificity and test, the life and relationship of the individual dwelling/ businesses to the proposed environment

Issues:

a. The current openness of the site is what initially attracts the passer-by.

b. The depth of the open territory is also unusual for the area. These qualities of visual depth and semi-openness should remain.

c. The material immediately apparent is the use of red brick. The small wood-constructed housing in the distance and the heavy concrete industrial structures are all visible albeit from the edges of the site.

d. Sizes and dimensions as described in the references in terms of light, dimensions, appropriate structural spans, mall access distances, parking constraints are applied to the site.

e. Appropriateness by public degree

f. Parking as access & demarcating public territory—must be urban therefore not positioned at street edge
Gestural Sketch: describing upper level of housing / industry
Collage: describing access / territory relationship

Site Model
Plan Diagram 1:
  a. Applying mall access & Industry spine dimension to the site.
  b. Seeking a set of orientations / directions
  c. Application of industry "fingering"
  d. Public territory @ Mass. Ave.

Plan Diagram 2
  a. Trying to generate interior semi-public space

Pan Diagram 3
  a. Acknowledging direction of Landsdowne (which is general orientation of the river)
  b. Small unit sizes distribute along domestic edge, generate territory on the interior of the site which in turn makes the exchange with larger housing sizes.
Plan Diagram 4
a. Housing sizes introduced on interior
b. Dealing with existing Sidney St. Offices

Plan Diagram 5
a. Examining "endpoints" of access lengths - terminate at public territories and streets, essentially acting as fabric distributors
b. Streets that pass East West, determined to be of larger pedestrian continuity, therefore orients the larger public / housing share areas.
Computer model of large Habitable Structural Member
Early Sectional Studies: Housing w/ Parking Below
Experimental Structure
Early Sectional Study: Experimental Structure
Industry w/ Housing Above
Experimental Structure
Project Model
Roof Detail

Project Model: View of Urban Collective
Proposal for housing and public parks for the city of Beirut

Site Model
Domeyko, Mixed-Use train station in Fribourg, Switzerland

Project Model
Computer Model: Massing Phase I
Examination of plan at Mass. Ave. - Hotel, Mall, Housing
Perspective of Hotel, Mall and Shopping St.
Perspective through semi-public housing territory

Perspective at Shopping Street

Structure at Shopping Street
Sidney St. Perspective
Perspective through various levels of Industry
Section Through Housing Above Industry
Computer Model: Structure and Enclosure
Computer Model: Interior of Structure
Computer Model: Massing Phase II
Plan: Housing, Industry, Mall, Hotel
Section: Industry access exchange w/ plaza
Section: Housing exchange w/ Industry
Section: Housing Exchange w/ Industry
VIII. Photo Credits

(Photographs not noted here are copyright, the Author)


p. 9 source unknown


p. 21 Bernard Rudofsky, Streets for People, a primer for Americans (New York: Doubleday & Company, 1969), fig. 89.

p. 23 (left) Zeidler, p. 12.

(center) Zeidler, p. 91.
(right) Hertzberger monograph, p. 191.

p. 25 (left) Hertzberger monograph, p. 72.
(right) Ibid., p. 73.

p. 26 (both) Zeidler, p. 110.


p. 29 Architecture D'Aujourd'Hui, Issue unknown

p. 30 (right) Hong Kong University of Science and Technology. Information pamphlet for Postgraduate studies in the Department of Civil and Structural Engineering, 1992.

p. 31 (upper and lower left) Chung, p. 148.

p. 32. (upper left) source unknown

166

(center) *Megastructure*, Banham, p. 12.
(right) Riani, p. 42.

p. 34 (left) Architecture D'Aujourd'Hui, Issue unknown


(right) *Megastructure*, Banham, p. 16.

(right) source unknown

p. 38 Banham, Reyner. *A Concrete Atlantis*, p. 251


(upper center) Ibid., p. 53.
(lower center) Ibid., p. 52.
(right) Ibid., p. 64.

p. 44 (left) Hertzberger monograph, p. 131.
(center) Ibid., p. 102.
(right) Ibid., p. 106.

(right) Ibid., p. 52.

p. 46 (left) Architekten Behnisch & Partner, Behnisch & Partners, p. 185.
(right) Ibid., p. 184.


(right) *SITE*, p. 64.

(right) Kirschenmann, p. 38.

p. 55 (left) Ibid., p. 115.
(right) Ibid., p. 114.

(center) Freixa, p. 199.
(right) Ibid., p. 198.


p. 60 *Streets for People*, Rudofsky, p. 161.

p. 61 (left) Zeidler, p. 24.

p. 62 (left) Ibid., p. 56.

(right) Ibid., p. 63.

p. 67  (left) photo by Federico Frassinetti.  
(center) Lipman, p. 78.

p. 68  (left) Hertzberger monograph, p. 275.  
(right) Ibid., p. 283.

(right) Ibid., p. 236.

(right) Ibid., cover.


p. 109 (left) Herdeg, p. 50.

(right) Ibid., p. 23

p. 111 (left) Ibid., p. 24  
(right) Ibid., p. 23

X. Bibliography:


Hong Kong University of Science and Technology. Information pamphlet for Postgraduate studies in the Department of Civil and Structural Engineering, 1992.

*Japan Architect* 4. “Housing.”


*Process Architecture.* “Jose Lluis Sert, His Work and Ways.”


Smith, Maurice. “Fragments,” a Form Language workshop publication.


Every properly functioning human being transforms the visual signals that he receives from outside into structured, meaningful entities. Without the perceptual ordering of his sense responses into images of things in space, man cannot orient himself. Without shaping his physical environment in accordance with these images, he cannot survive. His capacity to structure his environment according to his needs—that is, his ability to work out a rapport with his world-determines the quality of his life.

- Gyorgy Kepes, Introduction to Education of Vision

The 7 Train to Queens, NYC